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The Myriopoda of South Africa.—By C. ATTEMS (Vienna).

(With Plates I–XXVI and 84 Text-figures.)

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INTRODUCTION.

A CONSIDERABLE period of time has elapsed since the South African Museum delivered to me the whole of its Myriopod material, and I much regret that I have not been able to finish my report earlier.* I have been hindered by many circumstances, especially by the War and its consequences. Now at last the report is finished, and I hope that it will constitute a considerable step forward in our knowledge of the South African fauna. I believe the Cape Region to be now the best explored of all countries in the Southern Hemisphere as regards the Myriopod fauna.

The papers treating of the Myriopod fauna of South Africa are not numerous: Porat (2, 4), Silvestri (10), Grobbelaar, Attems (10).

Besides these papers dealing specially with the South African Myriopods, many papers contain systematic descriptions of South African species. A great number of them cannot be identified, particularly among the Diplopods, and if we pick out the serviceable descriptions, a list of 116 species remains. I can add here 137 new species and 12 species previously described but not recorded from South Africa; the total number is therefore more than doubled, viz. 265.

The detailed table (p. 22) shows which species were formerly known and which are new. I give here merely the summary.

	Chilopoda.	Symphyla.	Diplopoda.	Total Number.
Recorded before .	50	1	65	116
Described species new to South Africa .	8	..	4	12
New species . .	26	..	111	137
Total number .	84	1	180	265

Although I have said that the Cape Region is the best known of southern countries, I do not mean that its Myriopod fauna is as yet completely explored; on the contrary, I believe that many additions will be made, judging by the following facts.

* A further regrettable delay of several years, due to a combination of circumstances, has occurred between the receipt of the manuscript and its publication. It has had only one advantage, namely, that the author has been able to incorporate the results of some further collecting.—[Ed.]

The collection of the Museum, brought together with great zeal through many years, has been certainly productive of a very valuable increase in our knowledge; but it contains, in many cases, only one or very few examples of a given species. The material was evidently not selected, all the specimens found were taken as they came, and the conclusion is obvious that there are species in some districts of which no examples have been found. Thirty of the previously recorded species are not represented in the Museum's collection; eight of them, indeed, are from parts of South Africa which have been hardly or not at all explored by the collectors of the Museum; of the species from South-West Africa and the Kalahari, half were new. Thus we are led to assume that we are far from having attained a complete knowledge of the species really existent in South Africa.

Future investigators of the South African Myriopod fauna will have plenty to do; they have to find all the hitherto undetected species, and to fix the true limits of distribution of all the species. At present the great majority of the species are recorded from one locality only, and it is yet quite uncertain where the boundaries of these species are. Specimens must be collected in greater numbers in order to facilitate a better study of the species. Where there is only one specimen it cannot be examined with the accuracy that is to be desired, and it is evident that the amount of individual variation cannot be determined in such cases. The biology of the fauna is also an interesting subject. In a country with a climate which in many parts is extremely dry, the adaptations of Myriopods, generally fond of humidity, must be peculiar. How do they endure the long periods of drought? In what situations do they live and how do the young develop? What do they eat, and how quickly are the imported species spreading? The faunistic description, the true delimitation of the provinces, can only be made by somebody knowing the country.

The present paper lays no claim to be a regular monograph, because I do not believe that the time for a monograph has yet come. A monograph written to-day would in a short time be out of date and incomplete. Any such review of a group as the present paper usually evokes a certain number of other papers, descriptions of new species, faunistic lists, etc., and I hope that this paper also will have that effect. I leave the writing of a monograph to a later author and to a time when fewer subsequent additions are to be expected than is the case to-day.

For this reason I have not repeated the descriptions of all the well-

known species where I had nothing to add; but on the other hand I have considered some groups *in toto* (not merely the South African forms), where these groups had not previously been revised. Beginners wishing to study these interesting animals will, I hope, find these digressions useful. On p. 30 I have enumerated the papers containing descriptions of South African species cited, but not described, in the present paper. The number of these papers necessary for the beginner is not large.

In accordance with the wishes of the late Dr. Péringuey, I have paid particular attention to the keys, and the reader will find I have given keys to all generic and higher groups and also complete references to the literature. I hope that South Africa will soon produce someone who will continue the study of these interesting animals.

PART I.—FAUNISTIC REMARKS.

BOUNDARIES OF THE SOUTH AFRICAN FAUNAL REGION.

South Africa is the whole country south of the Kunene and Zambesi Rivers. This territory corresponds with the South African Region as defined by Weber, but is not identical with the South African subregion of Wallace, who does not include Southern Rhodesia, Bechuanaland, the Kalahari, or Damaraland in South Africa. I will not assert that the differences between South Africa and the neighbouring territories of Africa are fundamental, but the little we know of the northern parts of South Africa—Matabeleland, the Kalahari, and Damaraland, especially the latter—offers no reason for separating these countries from the rest of South Africa. The fauna of Damaraland especially is so closely allied to the fauna of the Cape Province that there is no propriety or sense in separating them sharply. We know almost nothing of the neighbouring western parts of Africa, north of the Kunene, belonging to the West African subregion, and the meagre list of species is quite different from the South African list. The limits of South Africa in the west seem to be easily and naturally fixed by the Kunene River. In the east it is more difficult to fix the limits; the Zambesi River is a convenient but somewhat arbitrary boundary, because it seems that the fauna of Matabeleland and South Mozambique is nearly allied to the fauna of North Mozambique, and passes little by little into the East African fauna. But the faunas of both North and South Mozambique are so imperfectly known that we must wait for more ample information.

When I say "fauna" in this article I am to be understood as meaning only the Myriopod fauna.

ZOOGEOGRAPHICAL SUBDIVISION OF SOUTH AFRICA.

With respect to the division of Africa into zoogeographical subregions, I adhere to the view of those authors who maintain that it is more important to collect data enabling us to reconstruct the faunistic history of the country, than to search for boundaries between regions of problematical value. We have known for a long time that it is impossible to divide the earth into regions, subregions, provinces, etc., valid for all groups of animals and also for all members of one group, *e.g.* the Myriopods. The different orders of the Myriopods have developed in different geological times, and therefore the relation of one order to the configuration of the earth to-day is different from that of another order. For example, the *Spirostreptoidea* are divided into two suborders, *Spirostreptidea* and *Odontopygidea*. Several genera of the first suborder live both in the Ethiopian and Neotropical Regions, which points to their development at a time when Africa and South America were connected. The second suborder, the *Odontopygidea*, is on the contrary entirely confined to the Ethiopian Region. Its origin is subsequent to the separation of Africa and South America. For these two suborders the intervening barrier of the sea has a completely different signification.

The division of South Africa into provinces is not easy. The first and greatest difficulty consists in the insufficiency of our faunistic knowledge. We know perhaps the majority of the species of the Cape Province and Damaraland, but we do not know for certain the distribution of each species, because a great number of these species have been found only on one occasion and in one locality. The remaining provinces have been still less explored. The second difficulty is that sharp transitions between the different parts of the territory do not seem to exist; the whole of the South African Myriopod fauna is more or less homogeneous and the transition to the East African fauna occurs gradually. The third difficulty is one that is personal to myself; I do not know the country, and I therefore cannot judge in what respects the several parts of the territory differ in relation to the biology of these animals. The Myriopods are greatly dependent for their dispersal on the vegetation and the climate, and they are especially fond of moisture. Territories without or nearly without vegetation are obstacles for these animals, but it

is extremely difficult, if not impossible, to imagine a difference in a biological sense for the Myriopods between the Karroo and Kalahari districts of Weber, and so on. If in spite of this I divide South Africa into provinces, I am conscious that later exploration will probably reveal better and more sharply defined lines of division.

We can distinguish four provinces in South Africa :

1. The Cape Province,* with Kaffraria and Natal.
2. Kalahari-South-West Africa, with Great Namaqualand, Damara-land, the Kalahari and Bechuanaland between the Orange and Kunene Rivers in the south and north, and bordering upon the Transvaal and Matabeleland in the east.
3. Transvaal.
4. Matabeleland-South Mozambique, between the Limpopo and Zambesi Rivers, with Matabeleland, Southern Rhodesia, and Southern Mozambique.

We shall first look at the fauna as a whole and then discuss the single provinces. The Myriopod fauna of South Africa is typically Ethiopian. The three great groups *Gomphodesmidae*, *Triaenostreptinae*, and *Odontopygidae*, characteristic of Africa and found nowhere else, are abundant also in South Africa.

CATEGORIES OF GENERA AND SPECIES FROM A ZOOGEOGRAPHICAL POINT OF VIEW.

For zoogeographical purposes the species and genera can be arranged in categories relatively to distinct territories. We can discern autochthonous† and imported species and genera. The autochthonous species are either endemic or widely dispersed. The latter may show a gradation according to the extent of the territory which we take into consideration and according to their dispersal, so that if we look at South Africa as a whole, species and genera are endemic if they are found in one or in several provinces ; but if we look at a single province a species is endemic if it lives only in this province, and widely dispersed if it lives in several provinces ; yet relatively to South Africa as a whole the same species can be said to be endemic.

* Not to be confused with the political division of the same designation from which Natal is excluded.—[ED.]

† Autochthonous is taken in this sense : living in a territory won by the species by natural means of dispersal ; but irrespective of the question whether the species arose in this territory or migrated into it from without.

The gradation of the widely dispersed species and genera is as follows : (a) the species lives in other provinces of South Africa, but not elsewhere ; (b) the species lives in other subregions of the Ethiopian Region ; (c) the species (or genus) lives in other regions. In this last category the genera found only in Africa and South America, Australia and New Zealand must be especially included.

The introduced species can be divided into (a) naturalised or acclimatised species (only these are true members of the fauna ; all the South African introduced species belong to this category except one) ; (b) species of which only the imported specimens are found, in situations where it is probable that they do not multiply.

In the first case the species may either be acclimatised in the open country of the territory or only in hot-houses, caves, warehouses, etc. In northern countries this latter is the more frequent, the species coming generally from hot countries and being unable to live in the open. Kraepelin observed in three years 490 species of animals imported into Hamburg by ships, but not a single one became naturalised in open country.

The same species imported into Cape Town can be naturalised with facility. Thus *Archilulus moreleti* from the Mediterranean subregion is found in Hamburg among merchandise only and does not multiply, whereas it is very common in the gardens of Cape Town. Twenty-eight species of Myriopods have been brought to Hamburg by ship, and several of these are acclimatised in the hot-houses of Hamburg, but none in the open country.

I give the following short synopsis of the categories of genera and species from the zoogeographical point of view :—

A. Autochthonous.

1. Endemic Category E.

(a) Endemic in only one province of South Africa Category E/1.

(b) Endemic and living in several provinces of South Africa
Category E/2 (South African species).

2. Widely spread.

(a) Dispersed in the remaining subregions of the Ethiopian Region,
but not elsewhere Category A (Ethiopian species).

(b) Dispersed also in other regions and occurring outside Africa in
South America, Australia, New Zealand Category S.

(c) Living in various other regions (widespread) Category W.

B. Imported Category I.

1. Naturalised.

(a) Acclimatised in the open.

(b) Living only in hot-houses, houses, warehouses.

2. Not naturalised.

The following tabular view demonstrates the number of genera and species of each category for each province :—

Category.	Genera.							Species.																		
	E.		A.	S.	W.	I.	Total number.	E.		A.	S.	W.	I.	Total number.												
	E/1.	E/2.	Living also in other Ethiopian parts.	Living also in South America, Australia, and New Zealand.	Widely spread.	Imported.		E/1.	E/2.	Living also in other Ethiopian parts.	Living also in South America, Australia, and New Zealand.	Widely spread.	Imported.													
	Endemic in							Endemic in																		
	one province.	more than one.						one province.	more than one.																	
Cape Province	20	12	6	9	12	3	62	136	25	7	2	1	4	175												
Kalahari-S.W. Africa	1	6	4	2	4	0	17	16	9	0	0	2	0	27												
Transvaal . . .	0	6	5	2	6	0	19	22	20	3	0	2	0	47												
Matabeleland-S. Mozambique .	2	8	14	3	10	0	37	29	10	12	0	3	0	55												
South Africa . .	36=42%		16	12	18	3	84	237	..	17	2	5	4	265												

AFFINITIES OF THE SOUTH AFRICAN MYRIOPOD FAUNA WITH THAT OF OTHER COUNTRIES.

To ascertain the affinities of the South African fauna we shall firstly look at the higher groups with respect to their distribution, and exclude from consideration the *Scrutigeromorpha*, *Lithobiomorpha*, and *Scolopendromorpha*, the families and higher groups represented in South Africa being so widely dispersed over the world that their distribution allows of no conclusions. The groups of the *Geophilomorpha* are somewhat more restricted in their distribution. Of the ten families, four are represented in South Africa: the *Oryidae*, *Mecistocephalidae*, *Schendylidae*, and *Geophilidae*. The *Oryidae* are divided into two subfamilies: the first (subfam. *Oryinae*) occurs in South and Central America, and South Africa and one genus (*Orya*) in the Mediterranean subregion. One species (*Orphnaeus brevilabiatus*) is widely dispersed in the tropics. The second subfamily (*Trematoryginae*) is not South African. The *Schendylidae* are represented by species of both subfamilies. The first subfamily (*Schendylinae*) is very widely dispersed, but the South African genus *Schendylurus* has rela-

tives in South America, where one subgenus (*Platyschendylurus*) lives. The second subgenus is found in Africa (South Africa, and the Mediterranean subregions of the Palaearctic Region). The second subfamily of *Schendylidae*, the *Ballophilinae*, inhabit South Africa, the Seychelles, Marianne Island, and South America, places too widely dispersed to give us useful comparisons.

The *Geophilidae* are divided into five subfamilies; four are represented in South Africa (the *Dignathodontinae* are not). Three of these subfamilies are so widely dispersed that we cannot take them into consideration; only the *Aphilodontinae* are important; they occur in South Africa and South America (Chile, Patagonia, Paraguay).

The *Symphyla*, with one species of a widely spread genus, are excluded.

The *Pselaphognatha* are an old group and the genera widely dispersed over the earth; even the species are unexpectedly widespread: *Monographis schultzei* occurs in South Africa and Australia, and the second species of the genus occurs in Java.

The distribution of the *Sphaerotheridae* is interesting. All the South African species belong to the same genus *Sphaerotherium*, and I doubt whether the species of *Sphaerotherium* of other countries belong really to the genus as defined in this paper. The whole classification of the *Sphaerotheridae* is a little dubious, and until a revision of the Asiatic genera is undertaken we cannot define with precision the relationships of the several forms.

Sphaerotheridae are found in South Africa (Cape Province and Transvaal), Madagascar, Nossi Bé, and throughout India from the Himalayas to Ceylon and Siam, in the Sunda Archipelago, the Philippines, North Australia, and New Zealand, but not in the New Guinea Archipelago. Their distribution depends upon the Indo-Madagascar bridge, and is closely similar to that of the family *Harpagophoridae*.

Of the numerous families of the *Polydesmoidea* only four are represented in South Africa. The *Strongylosomidae*, living in all regions except the Nearctic, and especially numerous in the Indo-Australian Region and in tropical Africa, have few species in South Africa. The *Sphaerotrichopidae*, living in America, Australia, New Zealand, and South Africa, point also to dispersal *via* an Antarctic continent. The *Gomphodesmidae* are purely Ethiopian and are especially numerous in East Africa. The *Vanhoeffeniidae* live in all regions except the Neotropical. The *Trigoniulidae* is a family widely dispersed throughout the tropics: Indo-Australia, South America, Africa. The *Cambalidae* are divided here into two subfamilies, the

first living in South America and South Africa, the second in South-West Australia.

The distribution of the *Spirostreptoidea*, forming as they do an important percentage of the whole South African fauna, is discussed in the systematic part (p. 324). I will only mention here that the *Triænostreptinae* and *Odontopygidae* are purely Ethiopian; the *Trachystreptini* are perhaps also Ethiopian, the only species recorded from the Carolines being dubious in systematic position. The *Spirostreptini* have a number of genera and subgenera common to South America and Africa, three of them occurring in South Africa.

The distribution of the genera is best illustrated by the following tabular view. In the first column the categories are indicated by the same characters as on p. 7.

TABLE SHOWING THE DISTRIBUTION OF THE GENERA.

	Category.	In South Africa.					Further distribution. (In brackets, the number of species.)
		Number of South African species.	Cape Province and Natal.	Kalahari-S.W. Africa.	Transvaal.	Matabeleland-S. Mozambique.	
<i>Scutigera</i> . . .	W					+	Palearctic Region.
<i>Scutigera</i> . . .	E/1	1	+				
<i>Lamyctes</i> . . .	W	5	+				East Africa, North America, India, Australia (5 species + 6 species dubious).
<i>Paralamyctes</i> . . .	S	5	+				Argentina, Chile (10).
<i>Lamyctopristus</i> . . .	E/1	1	+				Patagonia, Chile, New Zealand (4).
<i>Anopsobius</i> . . .	S	1	+				Palaeartic Region, Nearctic Region, Indo-Austr. Region (numerous species).
<i>Lithobius</i> . . .	I	1	+				Australia.
<i>Walesobius</i> . . .	S	1	+				Palaeartic Region, N. and S. America, India, Australia, Africa (ca. 60).
<i>Cryptops</i> . . .	W	6	+			+	All tropical and subtropical countries.
<i>Scolopendra</i> . . .	W	2	+	+	+	+	Texas (1), Australia (1).
<i>Arthrorhabdus</i> . . .	W	1	+		+		Australia (1), Syria, Mesopotamia, Zanzibar, East Africa (1).
<i>Trachycormocephalus</i> . . .	W	1		+			Australia (1).
<i>Hemicormocephalus</i> . . .	S	7	+				Australia, India, New Zealand, Philippines, Madagascar.
<i>Cormocephalus</i> . . .	W	19	+	+	+	+	

DISTRIBUTION OF GENERA (continued)—

<i>Colobopleurus</i>	.	S	3	+		+		Australia.
<i>Asanada</i>	.	W	7				+	India, Andamans, Senegambia, New Guinea (the same species as in South Africa).
<i>Rhysida</i>	.	W	3	+		+	+	Indo-Austr. Region, S. Amer- ica, Madagascar, Ethiopian Region (25).
<i>Ethmostigmus</i>	.	W	1			+	+	India, New Guinea, Australia, Africa (13).
<i>Alipes</i>	.	A	3	+			+	East Africa, Zanzibar, West Africa (6).
<i>Diphtherogaster</i>	.	E/2	1	+	+			
<i>Aspidopleres</i>	.	E/1	1		+			
<i>Mesoschendyla</i>	.	E/2	2	+	+			
Subgen. <i>Schendylurus</i>	.	S	2	+				S. America, Nicaragua, Brazil (3), Algiers, Morocco (2).
<i>Ballophilus</i>	.	W	1	+			+	East and West Africa, Java (5), Australia, New Caledonia, Loyalty Island (10).
<i>Purcellinus</i>	.	E/1	1	+				
<i>Geoperingueya</i>	.	E/1	1	+				
<i>Orphnaeus</i>	.	W	2			+	+	
<i>Mecistocephalus</i>	.	W					+	
<i>Achilophilus</i>	.	E/1	1	+				
<i>Eurytion</i>	.	S	7	+	+			Chile (3), perhaps also Australia and Cameroon (species dubious).
<i>Polygonarea</i>	.	E/2	3	+	+		+	
<i>Brachygonarea</i>	.	E/1	1	+				
<i>Philacroterium</i>	.	E/1	2	+				
<i>Aphilodon</i>	.	S	1	+				Argentina, Paraguay, Brazil (4).
<i>Hanseniella</i>	.	W	1	+				East Africa, India, S. America (15).
<i>Schindalmonotus</i>	.	E/2	1	+		+	+	
<i>Monographis</i>	.	W	1	+	+			S. Australia (the same species as in South Africa) (1), Java (1).
<i>Sphaerotherium</i>	.	E/2	31	+		+	+	
<i>Kylindotherium</i>	.	E/1	1	+				
<i>Podochresimus</i>	.	E/2	4	+			+	
<i>Phaeodesmus</i>	.	A	2		+		+	East Africa (3), Mozambique (1), West Africa (2).
<i>Orthomorpha</i>	.	I	1	+				
<i>Platytrarus</i>	.	E/1	1					
<i>Gonokollesis</i>	.	E/1	1	+				
<i>Gnomeskelus</i>	.	E/2	13				+	
<i>Harpethrix</i>	.	E/1	1	+				
<i>Philocaffrus</i>	.	E/1	4	+				
<i>Stenauchenia</i>	.	E/1	1	+				
<i>Antiphonus</i>	.	E/1	3	+				
<i>Aulodesmus</i>	.	A	4				+	N. Mozambique (1).
<i>Ulodesmus</i>	.	E/1	4	+				
<i>Neodesmus</i>	.	A	1	+			+	N. Mozambique (1).
<i>Vanhoeffenia</i>	.	E/1	1	+				
<i>Chersastus</i>	.	W	5	+			+	Sunda Archipelago, Moluccas, Seychelles.

DISTRIBUTION OF GENERA (continued)—

	Category.	In South Africa.					Further distribution. (In brackets, the number of species.)
		Number of South African species.	Cape Province and Natal.	Kalahari- S.W. Africa.	Transvaal.	Matabeland- S. Mozambique.	
Subgen. <i>Hemipodius</i>	I	1					Palearctic Region, Portugal, Madeira, Canaries, Cape Verde Islands, Cameroon.
<i>Julomorpha</i> . . .	E/1	M	+				
Subgen. <i>Spirostreptus</i> .	S	1				+	The whole Ethiopian Region, S. America.
<i>Bicoxidentis</i> . . .	E/1	2				+	
Subgen. <i>Doratogonus</i> .	A	6	+		+	+	N. Mozambique (1), Central Africa (1).
Subgen. <i>Scaphiostreptus</i>	S	1					West, Central, and East Africa, Zanzibar, Madagascar, Sey- chelles, S. America (35).
<i>Urotropis</i> *. . . .	A	1					Cameroon, Guinea (6), (S. America, 1 species dubious).
<i>Kartinikus</i> * . . .	A	1					Cameroon (4).
<i>Synophryostreptus</i> .	E/1	1				+	
<i>Camaricoproctus</i> . .	E/1	1	+				
<i>Alloporus</i>	S	6	+	+	+	+	N. Mozambique (1), Mada- gascar (1), S. America.
Subgen. <i>Orthoporus</i> .	S	4	+			+	Madagascar (2), S. America (23).
<i>Lophostreptus</i> . . .	A	3			+	+	East and Central Africa (7).
<i>Calostreptus</i> . . .	A	1				+	East Africa (the name of one not described species is pub- lished).
<i>Triastrostreptus</i> . .	A	6		+	+	+	Mozambique (1), West Africa (1).
<i>Graphidostreptus</i> . .	A					+	Mozambique, East Africa, Pemba, West Africa.
<i>Plagiotaphrus</i> . . .	A	1				+	East Africa (1).
<i>Harpagophora</i> . . .	E/2	8	+	+			
<i>Poratophilus</i> . . .	E/2	8	+	+	+	+	
<i>Thyropygus</i>	W	1	+				Madagascar (1), India (numer- ous species).
<i>Odontopyge</i>	A	5	+	+		+	
<i>Haplothysanus</i> . . .	A	2			+	+	East and Central Africa (11), Zanzibar (1), Sudan (1), Somaliland (1).
<i>Spinotarsus</i>	A	6	+	+	+	+	
<i>Patinatus</i>	E/1	1	+				
<i>Ardiophyllum</i> . . .	E/2	3	+		+	+	
<i>Storthophorus</i> . . .	E/2	4	+		+		
<i>Chaleponcus</i>	E/2	4	+	+	+	+	
<i>Helicochetus</i> . . .	A	1				+	
<i>Solenozophyllum</i> *	E/1	1					N. Mozambique, East Africa.
<i>Burenia</i>	E/1	1	+				

* *Urotropis*, *Kartinikus*, and *Solenozophyllum* are monotypic genera; the exact locality for the species is not known ("South Africa"), and the genera cannot be ascribed to any particular province.

We have 36 endemic genera (E). Twenty-one are new and described here for the first time. Sixteen genera are purely Ethiopian (A); of these *Aulodesmus* and *Neodesmus* are found only in North Mozambique and belong more to the South African fauna than to the East African. The genera *Phaeodesmus*, *Calostreptus*, and *Plagiotaphrus*, *Graphidostreptus*, *Helicochetus* are on the contrary more East African, and are dispersed only in the Matabele-South Mozambique Province. For the knowledge of the connection of the South African fauna with others, these genera marked S in the foregoing table are the most interesting; the genera that South Africa, South America, and Australia have in common and among those especially the Chilopod genera *Paralamyctes*, *Anopsobius*, *Walesobius*, *Hemicormocephalus*, *Colobopleurus*, *Eurytion*, *Aphilodon*. The genera *Paralamyctes*, *Eurytion*, and *Aphilodon* live, besides South Africa, in South America; the genera *Walesobius*, *Hemicormocephalus*, and *Colobopleurus* in Australia; and *Anopsobius* in South America (Patagonia, Chile) and New Zealand. The partisans of the theory that continents were formerly connected with each other will find the distribution of the first-named three genera to be a further proof for a Brasilo-African continent. But I think one can explain the wide distribution without taking refuge in the fantastic theory above mentioned, as already stated in Kükenthal's Handbuch der Zoologie. I suppose that the said genera originated somewhere in the big curve South Africa-East Africa-India-East Asia, and have eventually spread as far as the utmost ends of this curve (South Africa, South America, South Australia) while perhaps already in the course of their spreading they died out in parts of this curve for climatical or other reasons. Among insects we know that the recent distribution of the genera may be totally different from that of former periods. Thus there are genera of insects, to-day exclusively Malay-Neotropical, which are to be found in Baltic amber. One *Eutyrrhapha* species living to-day in West Africa, Madagascar, and South America has been found in Prussian amber. Many similar cases are known. In the face of such facts we cannot find anything improbable in the above-mentioned theory of their spread; at any rate it is more plausible than the existence of continental bridges, of which there are no traces in geology, and which were only postulated to account for the distribution of animals. Nevertheless, we cannot prove our theory, as the Myriopods have as yet not yielded really serviceable traces from former epochs of the earth, and on account of their biological peculiarities are not likely to do so.

The distribution of the *Sphaerotheridae* can be explained in the same way as that of the above-mentioned *Chilopoda*, only that the *Sphaerotheridae* have confined themselves to the part of the curve that branches off in India over the Sunda Archipelago to Australia, and have not succeeded in getting to America *via* the east of Asia, similarly to the *Harpagophoridae*, which, however, have not got further than the Sunda Archipelago and the Philippine Islands, and have not reached Australia.

The widespread genera have no special interest. The names appear in the list.

Distribution of the Species.

Most of the species (237 out of 265) are endemic. The Cape Province has the greatest number of endemic species, 136 out of 175, or 77 per cent. ; the other provinces 46 per cent. to 56 per cent. On the average, half the species are endemic in these provinces.

Twenty-eight species are also found elsewhere than in South Africa : four are imported ; five are very widely spread (*Scolopendra morsitans*, *Ethmostigmus trigonopodus*, *Asanada brevicornis*, *Mecistocephalus insularis*, *Orphnaeus brevilabiatus*). Two are found in Australia (*Monographis schultzei*) or New Zealand (*Cryptops australis*). The remaining seventeen are Ethiopian ; five are found in North Mozambique only (*Aulodesmus mossambicus*, *Neodesmus juvenis*, *Doratogonus flavifilis*, *Triaenostreptus petersi*, *Cormocephalus nitidus calvus*). The origin of some of these is somewhat dubious ; perhaps they belong partially to South Mozambique and, therefore, to the South African fauna. Eight species occur in East Africa and two in Madagascar.

This small number of species that South Africa has in common with other countries, only averaging 12 per cent. of its whole fauna, is also the reason why we can from the distribution of the species recognise so little about the connection between the South African and other faunas, and why we must keep to the distribution of the genera.

Altogether four species of Myriopods have been imported into South Africa, or at least four such have been observed. Probably the importation is made generally *via* Cape Town, where most ships touch. The imported species are, in fact, generally found in the neighbourhood of Cape Town. I would recommend South African entomologists to try to observe the spread of the imported species. The dispersal of imported species may be very rapid.

Of the four imported species one has been already mentioned ; one more comes from the Palaearctic Region, *Lithobius peregrinus* Latz. ;

the latter name given by the author without knowing the spreading propensities of the animal. The third, *Orthomorpha gracilis*, is very common in European hot-houses, but is not acclimatised to open country in Europe. In Budapest I found it in great numbers in hot-beds of the Margaretheninsel. This species must have some unknown biological peculiarity which facilitates its transport. No other species of exotic Diplopod is found so often in hot-houses, certainly no other species of the same genus. The fourth introduced species, *Scolopendra subspinipes* Leach, has been found only once, and hitherto seems not to have been naturalised; though the conditions would certainly appear to be favourable for such species. *Scolopendra morsitans* and others are abundant in South Africa. Some enormous specimens of the same species were found in the harbour in Hamburg. The next winter killed them. Perhaps the presence of *Scutigera* is also due to importation.

REMARKS ON THE FAUNA OF THE SEVERAL PROVINCES.

1. Cape Province (including Natal).

This is the largest, richest, and best explored Province, with 175 species and 62 genera; 136 species or 77 per cent. and 20 genera or 33 per cent. are endemic (E/1); 12 genera are endemic for the whole of South Africa (E/2); therefore almost exactly half of the genera (32 out of 62) are purely South African.

The following are endemic genera (E/1): *Scutigerina*, *Lamyctopristus*, *Purcellinus*, *Geoperingueyia*, *Achilophilus*, *Brachygonarea*, *Kylindotherium*, *Philacroterium*, *Platytarrus*, *Gonokollesis*, *Harpethrix*, *Philocaffrus*, *Stenauchenia*, *Antiphonus*, *Ulodesmus*, *Vanhoeffenia*, *Julomorpha*, *Camaricoproctus*, *Patinatius*, *Burenia*.

Twelve are South African genera, i.e. genera found in more than one South African Province but not elsewhere (E/2): *Diptherogaster*, *Mesoschendyla*, *Polygonarea*, *Schindalmonotus*, *Sphaerotherium*, *Podochresimus*, *Gnomeskelus*, *Harpagophora*, *Poratophilus*, *Ardiophyllum*, *Storthophorus*, *Chaleponcus*.

Six genera are Ethiopian: *Alipes*, *Neodesmus*, *Doratogonus*, *Alloporus*, *Odontopyge*, and *Spinotarsus*.

The genera *Paralamyctes*, *Anopsobius*, *Aphilodon*, and *Eurytion* are found in South Africa and South America; *Hemicormocephalus* and *Colobopleurus* in South Africa and Australia; *Alloporus* and *Orthoporus* in South Africa, Madagascar, and South America, but not

elsewhere. Thirteen genera are widely dispersed and of no special interest. All the imported genera and species are known only from this Province.

Of 175 species, 136 are endemic in this Province (E) and 25 are South African; therefore 159 species, or 92 per cent. of the whole fauna, consists of purely South African species. Four species are imported, and only ten species are dispersed in countries outside South Africa. These ten are the widespread *Scolopendra morsitans*; seven Ethiopian *Scolopendridae* (*Cormocephalus dispar*, *Cormocephalus nitidus*, *Cormocephalus nitidus calvus*, *Rhysida stuhlmanni*, *Rhysida afra*, *Alipes crotalus*, *Alipes grandidieri*); and two species, *Cryptops australis* and *Monographis schultzei*, common to South Africa and Australia. These two latter genera do not belong to the same class as those already cited; they occur in Australia, but *Cryptops* is dispersed over the whole earth, and *Monographis* is found also in Java. The last-named genus and the whole group *Pselaphognatha* are old, and their dispersal has no importance for zoogeographical questions. Besides, we may expect that these little *Pselaphognathus* will be found in many new intermediate localities. They are easily overlooked, and few explorers have collected them hitherto in extra-Palaeartic countries.

The genus *Sphaerotherium*, sensu stricto, is abundant; the remaining species live in the Transvaal, and three species in Portuguese East Africa (Mozambique).

The districts here united into one Province belong to the Erica-Karoo and Savanna Regions of Max Weber. Perhaps further exploration will provide a basis for subdivision, but the Myriopodologist has no reason to seek one. I hope that the active collectors of the Museum will continue their work and complete our knowledge of the distribution of the species in the different parts of the Province.

2. Kalahari-South-West Africa.

This seems to be the poorest Province. The poorness is easily explicable by the dryness and the bad conditions to which these animals are exposed; sandy countries are never favoured by Myriopods. It seems that the 27 species recorded hitherto constitute the great part of the actual fauna; since Michaelsen in 1911 secured only three species not found by Schultze in 1909.

The groups *Lithobiomorpha*, *Sphaerotheridae*, *Polydesmoidea*, *Cambaloidea*, *Trigoniulidae* are completely wanting in this Province. As we know nothing about the countries north of the Province, con-

jectures as to the origin of its fauna are difficult. Nevertheless it is evident that the Province has the closest affinities with the rest of South Africa: of 16 genera 6 are purely South African, and 3 out of 27 species are South African. We must therefore suppose that a great part of the fauna was derived from the neighbouring Cape Province. It is inexplicable that Wallace separated Damaraland from his South African subregion. Max Weber does not clearly define the limits of his Kalahari Region, which coincides nearly with the Province treated here.

Only one genus (*Aspidopleres*) is endemic (E/1). South African genera are: *Diphtherogaster*, *Mesoschendyla*, *Polygonarea*, *Harpagophora*, *Poratophilus*, *Chaleponcus*. Ethiopian genera: *Triaenostreptus*, *Odontopyge*, *Spinotarsus*. Two genera (*Eurytion*, *Alloporus*) are common to Africa and South America. There are in addition three widespread genera—*Scolopendra*, *Trachycormocephalus*, *Cormocephalus*.

Sixteen species or 59 per cent. are endemic: *Trachycormocephalus occidentalis*, *Cormocephalus esulcatus* Schultz, *Cormocephalus michaelsoni*, *Aspidopleres intercalatus*, *Eurytion kalaharinus*, *Eurytion aporopus*, *Phaeodesmus niger*, *Alloporus rugifrons*, *Triaenostreptus kymatorhabdus*, *Harpagophora diplocrada*, *Poratophilus robustus*, *Odontopyge hereronia*, *Spinotarsus castaneus*, *Spinotarsus xanthonotus*, *Chaleponcus limbatus*, *Chaleponcus niger*.

Nine species are South African and two are widespread.

3. Transvaal.

I include here the southern part of South Mozambique, with Lourenço Marques and Vryburg. The faunal boundaries between the Transvaal and Bechuanaland are yet to be determined.

I cannot believe that the majority of the fauna of this Province has yet been collected. There are no Polydesmids, while the neighbouring Cape Province has a great number, and the imperfectly known Mozambique and Matabeleland have at least several species. No endemic genus has been found. The known fauna includes six South African genera (*Schindalmonotus*, *Sphaerotherium*, *Poratophilus*, *Ardiophyllum*, *Storthophorus*, *Chaleponcus*); five Ethiopian genera (*Doratogonus*, *Lophostreptus*, *Triaenostreptus*, *Haplothysanus*, *Spinotarsus*); one genus (*Colobopleurus*) common to Africa and Australia, and one (*Alloporus*) to Africa and South America. Six genera are widely spread (*Scolopendridae* and *Geophilidae*). Of the

47 species, 24 (or 52 per cent.) are endemic, 18 species South African ; therefore 42 species or 90 per cent. of the total are purely South African. Three species are Ethiopian and two are widely spread.

This country should be better explored. The neighbouring Orange Free State is *terra incognita*.

4. Matabeleland (including Southern Rhodesia and South Mozambique).

The southern half of Mozambique, south of the Zambesi, belongs undoubtedly to the same zoogeographical province, and as the political limits are not in question I take also South Mozambique into consideration. It is difficult to decide whether the Zambesi is a good boundary or whether parts also of North Mozambique should be included in the Province. We know next to nothing about Mozambique ; few species are recorded and these in part labelled merely "Mozambique," leaving it uncertain whether the town or the whole country, and in this case which locality, is meant. Therefore the true number of species recorded for South Mozambique cannot be fixed.

This Province forms a transition between East Africa and South Africa, and its fauna has a greater affinity to that of East Africa than to that of any other South African Province. This affinity is proved by the fact that of eleven Ethiopian genera five* have penetrated to this part of South Africa and no further. The genera *Asanada*, *Lamnonyx*, *Spirostreptus*, dispersed over a wide area and especially in East Africa, do not pass beyond the Matabele-Mozambique Province. Of nine Ethiopian species six occur only in East Africa and the Matabele-Mozambique Province : *Alipes calcipes*, *Neodesmus juvenis*, *Spirostreptus semilunaris*, *Alloporus uncinatus*, *Doratogonus styliifer*, *Graphidostretus gigas* ; only two (*Rhysida afra*, *Ethmostigmus trigonopodus*) occur also in other South African Provinces, and they are very common, *Scolopendridae* having little importance from the zoogeographical standpoint.

The last expeditions demonstrated that the affinity with the remaining South African Provinces is not so small as formerly supposed, but contrary to Wallace's opinion we could separate it from South Africa with more reason than in the case of Damaraland. Affinity to South Africa is shown, however, by eight South African genera, *Polygonarea*, *Schindalmonotus*, *Podochresimus*, *Gnomeskelus*, *Chaleponcus*, *Poratophilus*, *Ardiophyllum*, and *Sphaerotherium*—the

* *Aulodesmus*, *Calostreptus*, *Plagiotaphrus*, *Helicochetus*, *Graphidostreptus*.

last being represented by only three species in this Province, the last outposts of the rich Cape Province and Transvaal fauna—and by three South African species of *Cormocephalus*: *C. oligoporus*, *C. anceps*, *C. brevicornis*.

The Province has two endemic genera, *Bicoxidens*, *Synophryostreptus*. Together with the eight genera enumerated above we have ten South African genera. The genus *Aulodesmus* almost belongs to the endemic genera, because only one species, *A. mossambicus*, is found in both North and South Mozambique; all the other species inhabit South Mozambique and Matabeleland. The widespread genera *Scolopendra*, *Cryptops*, *Cormocephalus*, *Ethmostigmus*, *Rhysida*, and *Lamnonyx* are not of interest in the present connection.

Of the total of 55 species, 30 are endemic: *Cryptops rhodesianus*, *Sphaerotherium kitharistes*, *Sphaerotherium millepunctatum*, *Podochresinus alatus*, *Gnomeskelus spinifer*, *Gnomeskelus dentipes*, *Phaodesmus rhodesianus*, *Aulodesmus laticollis*, *Aulodesmus peringueyi*, *Aulodesmus oxygonus*, *Chersastus splendidus*, *Chersastus vulparius*, *Gymnostreptus pontifex*, *Bicoxidesmus nigerrimus*, *Bicoxidesmus flavicollis*, *Synophryostreptus punctatus*, *Lophostreptus cameranii*, *Lophostreptus carli*, *Calostreptus carinatus*, *Triaenostreptus petersi*, *Triaenostreptus conatus*, *Plagiotaphrus longius*, *Poratophilus junodi*, *Poratophilus brevilobatus*, *Odontopyge dolabrata*, *Odontopyge bullata*, *Haplothysanus modestus*, *Ardiophyllum matabelinum*, *Chaleponcus masiniensis*, *Spinotarsus robustus*.

Two species, *Aulodesmus mossambicus* and *Doratagonus flavifilis*, occur in North and South Mozambique, not elsewhere. The Ethiopian and South African species are enumerated above. Three species are widely spread: *Scolopendra morsitans*, *Asanada brevicornis*, *Mecistocephalus insularis*.

Poratophilus brevilobatus n. sp. described here, labelled "Mozambique," is perhaps also South African; the remaining species of *Poratophilus* all inhabit South Africa, and *brevilobatus* alone extends beyond the Zambesi River.

Sphaerotherium apicale and *Sphaerotherium boerium* are recorded from Lourenço Marques, but as the south-eastern part of South Mozambique is better included in the Transvaal, these species do not figure in the list of the present Province. Two species of *Sphaerotherium*, *S. kitharistes* from Macequec and *S. giganteum* from Mozambique (and Cape Province, etc.), enter the Matabele-Mozambique Province.

Our knowledge, relative especially to Portuguese South Africa, has been considerably augmented by some expeditions in recent years,

and I give here the full list of the species known from South Mozambique :

Polygonarea oligopus.
Orphnaeus meruinus.
Ballophilus braunsi.
Rhysida afra.
Ethmostigmus trigonopodus.
Cormocephalus cupipes.
Scolopendra morsitans.
Scutigera coleoptrata natalensis.
Schindalmonotus hystrix.
Sphaerotherium millepunctatum.
Sphaerotherium coniferum.
Sphaerotherium giganteum.
Sphaerotherium apicale.
Sphaerotherium boerium.
Podochresimus alatus.
Gnomeskelus spinifer.
Gnomeskelus dentipes.
Aulodesmus oxygonus.
Aulodesmus mossambicus.
Neodesmus juvenis.
Chersastus splendidus.

Chersastus vulparius.
Spirostreptus semilunaris.
Alloporus uncinatus.
Doratogonus flavifilis.
Doratogonus styliifer.
Gymnostreptus pontifex.
Synophryostreptus punctatus.
Lophostreptus carli.
Triaenostreptus conatus.
Triaenostreptus petersi.
Graphidostreptus gigas.
Poratophilus junodi.
Poratophilus brevilobatus.
Poratophilus similis.
Odontopyge dolabrata.
Odontopyge bullata.
Haplothysanus modestus.
Ardiophyllum matabelinum.
Helicochaetus dimidiatus.
Chaleponcus masiniensis.
Spinotarsus robustus.

SUMMARY OF THE PRINCIPAL FAUNISTIC FEATURES.

1. The limits of South Africa are the Kunene and Zambesi Rivers. In the west these limits are possibly well defined ; in the east, Mozambique (and Matabeleland) is a territory of transition to the East African Region.

2. South Africa is provisionally divided into four Provinces, but these Provinces show no great differences in fauna. The distribution of most species is very imperfectly known, and we must await further exploration in order to define provinces based on complete data of the distribution of all species.

3. Endemics are very numerous ; almost 90 per cent. of the species and more than 42 per cent. of the genera are endemic.

4. The groups typical of the Ethiopian Region and found only in that region are largely represented in South Africa.

5. South Africa, South America, and Australia-New Zealand have a number of species in common that are to be found nowhere else. To explain this distribution we need not recur to the theory of continental bridges a Brasilo-African continent ; the dispersal took place on the curve South Africa-India, with a branching off on one side over the Sunda Archipelago to Australia, on the other side by

Eastern Asia to America. Later on the genera died out again on a large part of this curve.

6. The *Sphaerotheridae* and *Harpagophoridae* are common to South Africa, Madagascar, and India. Their dispersal is doubtless due to the former Indo-Madagascar land-bridge. The *Sphaerotheridae* arose probably in Asia, the *Harpagophoridae* in Africa.

7. The number of imported species is relatively considerable—nearly 2 per cent. of the total.

PART II.—SYSTEMATIC DIVISION.

LIST OF THE SOUTH AFRICAN SPECIES AND THEIR DISTRIBUTION.

Remarks on the List.

In Column 1 the new species are marked by the sign +.

Column 2 shows the categories of the species from the zoogeographical point of view in the same manner as on p. 7. E stands for endemic in South Africa; E/1 for endemic in one Province only; E/2 for endemic in two or more Provinces of South Africa; A for occurrence in Africa (South Africa and other parts of Africa); S for occurrence in Africa and also in Australia and New Zealand; W for wide distribution in other regions; I for introduction.

In Column 3 the species recorded for South Africa previous to the present paper are marked by a + (116 species).

Column 4 shows what species are contained in the collection of the South African Museum.

Columns 5–9 give the distribution; Columns 5–8 for the Provinces of South Africa, Column 9 for regions outside South Africa. An asterisk in Columns 5–8 denotes that the species was recorded for this Province before (*e.g.* *Cormocephalus anceps* was recorded before from the Cape Province and Transvaal; here it is recorded also from Damaraland and Matabeleland).

Columns 10–12 indicate where the descriptions are to be found; the numbers of Column 10 are the same as in the short list of literature on p. 30.

Column 12 forms an index to the systematic part of this paper.

Certain species cannot be ascribed to a precise Province, because the specimens are merely labelled "South Africa." These species are: *Scaphiostreptus diphialephorus*, *Urotropis micropora*, *Kartinikus australis*, *Poratophilus australis*, *Chaleponcus niger*, *Solenozophyllum anoncopygum*.

Column	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	
	Nov. spec.	Category.	Recorded for S. Africa before.	Present in the Museum Coll.	Distribution.					Further distribution.	Description	Page of the present paper.	
					South Africa.								
					Cape Province, Natal.	Kalahari-S.W. Africa.	Transvaal.	Matabeleland-S. Mozambique.					
I. CHILOPODA.													
1. SCUTIGEROMORPHA.													
1. <i>Scutigera coleoptrata natalensis</i> Verh.	..	E/2	+	+	*+	..	..	+	..	..	..	+	39
2. <i>Scutigerina weberi</i> Silv.	..	E/1	+	+	*+	..	..	..	..	..	..	+	41
2. LITHOBIOMORPHA.													
3. <i>Lamyctes africana</i> Por.	..	E/1	+	+	*+	..	..	..	..	..	..	+	56
4. <i>L. castanea</i> Att.	..	E/1	+	..	*+	..	..	..	..	..	4	..	59
5. <i>L. denticulata</i> Att.	..	E/1	+	+	*+	..	..	..	..	..	3	..	59
6. <i>L. micropora</i> Att.	..	E/1	+	..	*+	..	..	..	..	..	4	..	59
7. <i>L. sinuata</i> Por.	..	E/1	+	+	*+	..	..	..	..	..	4	..	59
8. <i>Lamyctopristus</i> nov. <i>validus</i> n. sp.	+	..	..	+	+	..	..	..	..	..	..	+	65
9. <i>Paralamyctes spenceri</i> Poc.	..	E/1	+	+	*+	..	..	..	..	..	..	+	68
10. <i>P. weberi</i> Silv.	..	E/1	+	+	*+	..	..	..	..	..	..	+	70
11. <i>P. asperulus</i> Silv.	..	E/1	+	..	*+	..	..	..	..	..	10	..	70
12. <i>P. tabulinus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	..	+	70
13. <i>P. levigatus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	..	+	71
14. <i>Anopsobius patagonicus calcaratus</i> n. subsp.	+	E/1	..	+	+	..	..	..	..	..	..	+	74
15. <i>Walesobius excrecens</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	..	+	78
16. <i>Lithobius peregrinus</i> Latz.	..	I	..	+	+	..	..	..	Palaeartic Region: Dalmatia, Lombardy, Zante, Erdchias Dag.	..	..	+	79
3. SCOLOPENDROMORPHA.													
17. (1) <i>Cryptops rhodesianus</i> n. sp.	+	E/1	..	+	..	..	..	+	..	..	..	+	85
18. (2) <i>C. peringueyi</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	..	+	86
19. (3) <i>C. stupendus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	..	+	87
20. (4) <i>C. audax</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	..	+	88
21. (5) <i>C. philammus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	..	+	89
22. (6) <i>C. australis</i> Newp.	..	S	..	+	+	..	..	..	New Zealand	..	..	+	89
23. <i>Scolopendra morsitans</i> L.	..	W	+	+	*+	*+	*+	*+	Most tropical countries	8	..	91	
24. <i>S. subspinipes</i> Leach	..	I	+	+	+	..	..	..	India, Australia, etc.	8	..	91	
25. <i>Arthrorhabdus formosus</i> Poc.	..	E/2	+	+	..	..	+	..	..	..	8	..	91
26. <i>Trachycormocephalus occidentalis</i> Att.	..	E/1	+	..	*+	*+	..	..	..	..	4	..	92

Column	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
	Nov. spec.	Category.	Recorded for S. Africa before.	Present in the Museum Coll.	Distribution.						Description	Page of the present paper.
					South Africa.				Further distribution.	in No. of the following literature list.	in this paper.	
					Cape Province, Natal.	Kalahari-S. W. Africa.	Transvaal.	Matabeleland- S. Mozambique.				
27. <i>Hemicormocephalus multispinus</i> Kraep.	..	E/1	+	+	*+	..	..	..	..	8	..	93
28. (1) <i>Cormocephalus pontifex</i> n. sp.	+	E/1	..	+	..	..	+	..	..	..	+	95
29. (2) <i>C. esulcatus schultzei</i> Att.	..	E/1	+	+	..	*+	..	..	..	4	..	95
30. (3) <i>C. esulcatus capensis</i> n. subsp.	+	E/1	..	+	+	..	..	..	..	..	+	95
31. (4) <i>C. punctatus</i> Por.	..	E/2	+	+	+	..	+	..	..	8	..	96
32. (5) <i>C. pseudopunctatus</i> Kraep.	..	E/2	+	+	*+	..	+	..	..	8	..	96
33. (6) <i>C. setiger</i> Por.	..	E/1	+	+	*+	..	..	..	..	..	+	96
34. (7) <i>C. oligoporus</i> Kraep.	..	E/2	+	+	+	*+	+	+	..	8	..	97
35. (8) <i>C. insulanus</i> Att.	..	E/1	+	..	..	*+	..	..	..	..	+	97
36. (9) <i>C. multispinosus</i> Att.	..	E/2	+	+	*+	*+	+	..	..	..	+	98
37. (10) <i>C. cupipes</i> Poc.	..	E/2	+	+	+	..	+	..	..	..	+	99
38. (11) <i>C. dispar</i> Por.	..	A	+	+	*+	..	*+	..	Madagascar	..	+	99
39. (12) <i>C. calcaratus</i> Por.	..	E/1	+	+	*+	..	..	..	..	8	..	100
40. (13) <i>C. aeruginosus</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	100
41. (14) <i>C. nitidus</i> Por.	..	A	+	+	*+	..	*+	..	Madagascar	..	+	100
42. (15) <i>C. nitidus calvus</i> n. subsp.	+	A	..	+	+	..	..	..	Mozambique	..	+	101
43. (16) <i>C. anceps</i> Por.	..	E/2	+	+	*+	+	*+	+	..	..	+	101
44. (17) <i>C. anceps segnis</i> n. subsp.	+	E/2	..	+	+	..	+	..	..	..	+	101
45. (18) <i>C. brevicornis</i> Kraep.	..	E/2	+	+	+	..	+	*+	..	8	..	102
46. (19) <i>C. elegans</i> Kraep.	..	E/2	+	+	+	*+	*+	..	..	8	..	102
47. <i>Colobopleurus devylderi</i> Por.	..	E/2	+	+	*+	..	*+	..	..	8	..	104
48. <i>C. parcespinatus</i> Por.	..	E/1	+	+	*+	..	..	..	..	8	..	104
49. <i>C. fontinalis</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	105
50. <i>Asanada brevicornis</i> Mein.	..	W	+	+	..	..	..	*+	Himalaya, New Guinea, Socotra, Senegambia	8	..	105
51. <i>Rhysida stuhlmanni</i> Kraep.	..	A	..	+	+	..	..	..	East Africa	8	..	106
52. <i>R. petersi</i> Por.	..	E/2	+	+	*+	..	*+	..	..	8	..	106
53. <i>R. afra</i> (Pet.)	..	A ?	+	+	*+	..	*+	+	N. Mozambique ?	8	..	107
54. <i>Ethmostigmus trigonopodus</i> Leach	..	W	+	+	..	..	*+	*+	Africa from Algiers to the Cape	8	..	107
55. <i>Alipes calcipes</i> Cook	..	A	..	+	..	..	..	+	Quango, Angola	8	..	108
56. <i>A. crotalus</i> (Gerst.)	..	A	..	+	*+	..	..	..	Uganda	8	..	108
57. <i>A. grandidieri</i> (Luc.)	..	A	+	..	*+	..	..	..	East Africa, Zanzibar	8	..	108
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58. <i>Diphtherogaster flavus</i> Att.	..	E/2	+	+	..	*+	..	..	..	4	..	114
59. <i>Aspidopleres intercalatus</i> Por.	..	E/1	+	+	*+	*+	..	..	..	..	+	120

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60. <i>Orphnaeus brevilabiatus</i> Newp.	..	W	..	..	..	..	+	..	Ubiquitous in the tropics	..	..	124
61. <i>O. meruinus</i> Att.	..	A	..	+	..	..	..	+	East Africa	..	..	125
62. <i>Mecistocephalus insularis</i> Luc.	..	W	..	..	..	..	..	+	Ubiquitous in the tropics	..	..	126
63. <i>Mesoschendyla monopora</i> Att.	..	E/2	+	..	*	+	..	..	..	4	..	129
64. <i>M. caledonica</i> n. sp.	+	E/1	..	+	*	+	..	..	..	..	+	129
65. <i>Schendylurus australis</i> Silv.	..	E/1	+	..	*	+	..	..	..	11	..	134
66. <i>S. polypus</i> n. sp.	..	E/1	..	+	..	+	..	..	..	..	+	134
67. <i>Ballophilus braunsi</i> Silv.	..	E/2	+	+	*	+	..	+	..	..	+	140
68. <i>Purcellinus</i> nov. <i>robustus</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	149
69. <i>Geoperingueyia</i> nov. <i>conjungens</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	150
70. <i>Achilophilus</i> nov. <i>monoporus</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	154
70a. <i>Pachymerium tristanicum</i> n. sp.	+	..	..	+	..	..	..	..	Tristan d'Acunha	..	+	157
71. <i>Eurytion dolichocephalus</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	162
72. <i>E. trichopus</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	165
73. <i>E. aporopus</i> Att.	..	E/1	+	..	*	+	..	..	..	..	+	167
74. <i>E. badiceps</i> Att.	..	E/1	+	+	*	+	..	..	..	4	..	168
75. <i>E. dentatus</i> Att.	..	E/1	+	+	*	+	..	..	..	4	..	168
76. <i>E. sabulosus</i> Att.	..	E/1	+	+	*	+	..	..	..	4	..	168
77. <i>E. kalaharinus</i> Att.	..	E/1	+	..	..	*	+	..	..	4	..	168
78. <i>Polygonarea kraepelini</i> (Silv.)	..	E/2	+	..	*	*	+	..	..	4	..	174
79. <i>P. oligopus</i> Att.	..	E/2	+	+	*	+	..	+	..	4	..	173
80. <i>P. monospathis</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	175
81. <i>Brachygonarea apora</i> (Att.)	..	E/1	+	+	*	+	..	..	..	4	..	178
82. <i>Philacroterium</i> nov. <i>cribellatum</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	183
83. <i>P. pauperum</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	186
84. <i>Aphilodon weberi</i> Silv.	..	E/1	+	+	*	+	..	..	..	..	+	190
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85. <i>Hanseniella capensis</i> (Hans.)	..	E/1	+	+	*	+	..	..	..	7	..	193
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86. <i>Schindalmonotus</i> nov. <i>hystrix</i> n. sp.	+	E/2	..	+	+	..	+	..	..	..	+	195
87. <i>Monographis schultzei</i> Att.	..	S	+	+	+	*	+	..	S. Australia	4	..	198

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88. (1) <i>Sphaerotherium spinatum</i> Silv.	..	E/1	+	+	*+	..	..	..	..	..	+	213
89. (2) <i>S. rotundatum</i> Brandt	..	E/2	+	+	*+	..	*+	..	..	..	+	214
90. (3) <i>S. tenuitarse</i> Silv.	..	E/2	+	+	*+	..	*+	..	..	..	+	215
91. (4) <i>S. kitharistes</i> n. sp.	..	E/1	+	+	..	..	..	+	..	..	+	216
92. (5) <i>S. granulatum</i> Poc.	..	E/1	+	..	*+	..	..	..	..	12	..	217
93. (6) <i>S. convexitarsum</i> Silv.	..	E/1	+	..	*+	..	..	..	..	12	..	217
94. (7) <i>S. commune</i> n. sp.	..	E/1	+	+	+	..	..	..	..	..	+	218
95. (8) <i>S. weberi</i> Silv.	..	E/1	+	..	*+	..	..	..	..	12	..	219
96. (9) <i>S. millepunctatum</i> n. sp.	+	E/1	..	+	..	..	..	+	..	..	..	219
97. (10) <i>S. tuberosum</i> n. sp.	+	E/2	..	+	+	..	+	..	..	..	+	220
98. (11) <i>S. trichopygum</i> (Att.)	..	E/1	+	+	*+	..	..	..	..	..	+	221
99. (12) <i>S. intermedium</i> Por.	..	E/1	+	..	*+	..	..	..	..	12	..	222
100. (13) <i>S. submite</i> Silv.	..	E/1	+	..	*+	..	..	..	..	12	..	222
101. (14) <i>S. cinctellum</i> Silv.	..	E/1	+	+	*+	..	..	..	..	..	+	222
102. (15) <i>S. plagiarium</i> Silv.	..	E/1	+	+	*+	..	..	..	..	..	+	224
103. (16) <i>S. ancillare</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	225
104. (17) <i>S. dorsaloide</i> Silv.	..	E/1	+	+	*+	..	..	..	..	..	+	225
105. (18) <i>S. dinogonum</i> Silv.	..	E/1	+	..	*+	..	..	..	..	12	..	226
106. (19) <i>S. dorsale</i> Gerv.	..	E/1	+	+	*+	..	..	..	..	..	+	227
107. (20) <i>S. subdorsale</i> Silv.	..	E/2	+	+	+	..	*+	..	..	..	+	228
108. (21) <i>S. boerium</i> Silv.	..	E/1	+	..	..	..	*+	..	..	12	..	229
109. (22) <i>S. apicale</i> Silv.	..	E/1	+	..	..	..	*+	..	..	12	..	229
110. (23) <i>S. eremita</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	229
111. (24) <i>S. modestum</i> n. sp.	+	E/1	..	+	..	..	+	..	..	..	+	230
112. (25) <i>S. coniferum</i> Silv.	..	E/1	+	..	..	..	*+	..	..	12	..	230
113. (26) <i>S. permodestum</i> Silv.	..	E/1	+	..	..	..	*+	..	..	12	..	231
114. (27) <i>S. civicum</i> n. sp.	+	E/1	..	+	+	..	..	..	..	..	+	231
115. (28) <i>S. dicrothrix</i> n. sp.	+	E/1	..	+	..	..	+	..	..	..	+	232
116. (29) <i>S. solitarium</i> n. sp.	+	E/1	..	+	..	..	+	..	..	..	+	233
117. (30) <i>S. punctulatum</i> Brandt	..	E/1	+	+	*+	..	..	..	..	..	+	234
118. (31) <i>S. giganteum</i> Por.	..	E/2	+	+	*+	..	+	..	..	..	+	235
119. <i>Kylindotherium</i> nov. leve n. sp.	+	E/1	..	+	+	..	..	..	..	..	..	237
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122. <i>P. republicanus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	245
123. <i>P. fonticinus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	247

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124. <i>Habrodesmus rhodesianus</i> n.sp.	+	E/1	..	+	..	..	..	+		..	+	247	
125. <i>Phaeodesmus niger</i> n. sp.	+	E/1	..	..	..	+	..	..		..	..	249	
126. <i>Orthomorpha gracilis</i> Koch	..	I	+	+	+	..	..	..	Japan, Chile, Paraguay, Brazil, many botanical gardens of Europe (hot-houses)	1	..	250	
127. <i>Platytarrus</i> nov. <i>cryptodesmoides</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	252	
128. <i>Gonokollesis</i> nov. <i>nanus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	253	
129. (1) <i>Gnomeskelus clavatus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	256	
130. (2) <i>G. dentipes</i> n. sp.	+	E/1	..	+	..	..	..	+		..	..	257	
131. (3) <i>G. rhodobates</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	258	
132. (4) <i>G. terreus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	259	
133. (5) <i>G. silvaticus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	260	
134. (6) <i>G. natalicus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	261	
135. (7) <i>G. globifer</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	262	
136. (8) <i>G. repandus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	263	
137. (9) <i>G. ceresinus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	264	
138. (10) <i>G. puteinus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	265	
139. (11) <i>G. spinifer</i> n. sp.	+	E/1	..	+	+	..	..	+		..	..	265	
140. (12) <i>G. globulatus</i>	..	..	..	..	..	..	..	..		5a	..	266	
141. (13) <i>G. penicillatus</i>	..	..	..	..	..	..	..	..		5a	..	266	
142. <i>Philocaffrus</i> nov. <i>destitutus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	267	
143. <i>P. divisus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	268	
144. <i>P. polydesmoides</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	269	
145. <i>P. bifalcatus</i> n. sp.	+	E/1	..	+	+	..	..	..		2	+	270	
146. <i>Harpethrix</i> nov. <i>plana</i> n. sp.	+	E/1	..	+	+	..	..	..		..	..	271	
147. <i>Stenauchenia braunsi</i> , Att.	..	E/1	+	..	+	..	..	..		..	..	272	
148. <i>Antiphonus conatus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	274	
149. <i>A. circulus</i> n. sp.	+	E/1	..	+	+	..	..	..		2	+	275	
150. <i>A. diploconus</i> Att.	..	E/1	+	..	+	*	+	..		..	..	276	
151. <i>Autodesmus laticollis</i> n. sp.	+	E/2	..	+	..	..	..	+		6	+	278	
152. <i>A. oxygonus</i> Pet.	..	E/1	+	+	..	..	..	*	+	..	..	279	
153. <i>A. peringueyi</i> n. sp.	+	E/1	..	+	..	..	..	+		6	+	279	
154. <i>A. mossambicus</i> Cook	..	A	+	..	..	..	..	*	+	N. Mozambique	6	..	280
155. <i>Uloidesmus micramma</i> Cook	..	E/1	+	+	*	+	..	+		..	..	281	
156. <i>U. biconus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	282	
157. <i>U. bispinosus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	283	
158. <i>U. securifer</i> n. sp.	+	E/1	..	+	+	..	..	..		6	+	284	
159. <i>Neodesmus caffrarius</i> (Por.)	..	E/1	+	..	*	+	..	..		6	..	285	
160. <i>N. juvenis</i> Cook.	..	A	+	..	..	..	..	+	N. Mozambique	3	..	285	
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162. <i>Archilulus moreleti</i> Luc.	..	I	..	+	+	..	..	..	Portugal, Madeira, Canaries, Cape Verde Islands, Cameroon	..	+	291
Spiroboloidea.												
163. (1) <i>Chersastus fasciatus</i> n. sp.	+	E/1	..	+	+	..	..	..		..	+	301
164. (2) <i>C. splendidus</i>	..	E/1	..	+	..	..	..	+		..	..	303
165. (3) <i>C. ruber</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	304
166. (4) <i>C. silvanus</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	305
167. (5) <i>C. vulpinus</i>	..	E/1	..	+	..	..	..	+		..	..	305
168. (6) <i>C. atrophus</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	306
169. (7) <i>C. inscriptus</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	307
Spirostreptomorpha.												
Cambaloidea.												
170. (1) <i>Julomorpha kinbergi</i> Por.	..	E/1	+	+	*+	..	..	..		..	+	315
171. (2) <i>J. fortis</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	317
172. (3) <i>J. hilaris</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	317
173. (4) <i>J. ignava</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	317
174. (5) <i>J. concors</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	318
175. (6) <i>J. rixosa</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	318
176. (7) <i>J. celer</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	319
177. (8) <i>J. tristis</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	319
178. (9) <i>J. tarda</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	320
179. (10) <i>J. cicur</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	320
180. (11) <i>J. rudis</i> n. sp.	..	E/1	..	+	+	..	..	..		..	+	321
181. <i>J. (Hypochlorella) pallida</i> n. sp.	+	E	..	+	+	..	..	..		..	..	321
Spirostreptoidea.												
182. <i>Spirostreptus semilunaris</i> Pet.	..	A	+		..	..	..	*+	N. Mozambique, East Africa	5	..	329
183. <i>Bicoxidens nigerrimus</i> n. sp.	+	E/1	..	+	..	..	..	+		..	+	329
184. <i>B. flavicollis</i> n. sp.	..	E/1	..	+	..	..	..	+		..	+	330
185. (1) <i>Doratogonus flavifilis</i> (Pet.)	..	A	..	+	..	..	..	+	N. Mozambique	..	+	334
186. (2) <i>D. capricornis</i> n. sp.	..	E/1	..	+	..	..	..	..		..	+	335
187. (3) <i>D. annulipes</i> Carl.	..	E/1	+	+	+	..	..	..		..	+	336
188. (4) <i>D. xanthopus</i> n. sp.	..	E/1	+	+	+	..	..	..		..	+	337
189. (5) <i>D. setosus</i> (Vog.)	..	E/1	+	+	*+	..	+	..		..	+	338

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	Nov. spec.	Category.	Recorded for S. Africa before.	Present in the Museum Coll.	Distribution.				Further distribution.	Description		Page of the present paper.
					Cape Province, Natal.	Kalahari-S.W. Africa.	Transvaal.	Metabeland-S. Mozambique.		in No. of the following literature list.	in this paper.	
190. (6) <i>Doratogonus setosus uncinatus</i> n. subsp.	+	E/1	..	+	+	..	..	..	.. ..	..	+	338
191. (7) <i>D. styliifer</i> (Pet.)	..	A	+	..	..	..	..	*+	N. Mozambique, Zanzibar, Madagascar	5	..	340
192. <i>Scaphiostreptus diphialephorus</i> Att.	..	E/1	+	..	..	..	..	..	.. ..	5	..	341
193. <i>Urotropis micropora</i> Att.	..	E/1	+	..	..	..	..	..	.. ..	5	..	342
194. <i>Kartinikus australis</i> Att.	..	E/1	+	..	..	..	..	..	.. ..	5	..	343
195. <i>Synophryostreptus</i> nov. <i>punctatus</i> n. sp.	+	E/1	..	+	..	..	..	+	.. ..	..	+	343
196. <i>Camaricoproctus</i> nov. <i>bombycinus</i> n. sp.	+	E/1	..	+	+	..	..	..	.. ..	..	+	345
197. (1) <i>Alloporus uncinatus</i> Att.	..	A	..	+	..	..	..	+	East Africa	..	+	348
198. (2) <i>A. falcatus</i> n. sp.	..	E/1	..	+	+	..	..	..	.. ..	..	+	348
199. (3) <i>A. circulus</i> Att.	..	E/1	+	..	+	..	..	..	.. ..	5	..	349
200. (4) <i>A. rugifrons</i> n. sp.	..	+	E/2	..	..	*+	+	..	.. ..	..	+	349
201. (5) <i>A. castaneus</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	350
202. (6) <i>A. levigatus</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	351
203. <i>Gymnostreptus pyrrhocephalus</i> Koch	..	E/1	+	+	*+	..	..	..	.. ..	..	+	353
204. <i>G. tabulinus</i> Att.	..	E/1	+	+	*+	..	..	..	.. ..	..	+	354
205. <i>G. tabulinus</i> var. <i>exaratus</i> (new var.).	+	E/1	..	+	+	..	..	..	.. ..	..	+	356
206. <i>G. pontifex</i> n. sp.	..	E/1	..	+	..	..	..	+	.. ..	..	..	356
207. <i>Lophostreptus cameranii</i> Silv.	..	E/1	+	+	..	..	..	*+	.. ..	..	+	360
208. <i>L. ulopygus</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	360
209. <i>L. carli</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	361
210. <i>Calostreptus carinatus</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	362
211. (1) <i>Trienostreptus unciger</i> n. sp.	+	E/1	..	+	..	..	+	..	.. ..	..	+	365
212. (2) <i>T. kymatorhabdus</i> Att.	..	E/1	+	..	..	*+	..	..	.. ..	5	..	366
213. (3) <i>T. triodus</i> Att.	..	E/1	+	+	..	*+	..	..	.. ..	4,5	..	366
214. (4) <i>T. petersi</i> (Karsch)	..	A	+	+	..	..	..	*+	N. Mozambique	5	..	367
215. (5) <i>T. krügeri</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	367
216. (6) <i>T. conatus</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	368
217. <i>Plagiotaphrus longius</i> n. sp.	..	+	E/1	..	+	..	+	..	.. ..	..	+	369
218. <i>Graphidostreptus gigas</i> Pet.	..	A	..	+	..	..	+	..	S. Mozambique, Zanzibar, Gambia, East Africa	5	..	370
219. (1) <i>Harpagophora levis</i> n. sp.	+	E/1	..	+	+	..	..	..	.. ..	..	+	373
220. (2) <i>H. spirobolina</i> (Karsch)	..	E/1	+	+	*+	..	..	..	.. ..	5	..	374
221. (3) <i>H. diplocrada</i> Att.	..	E/1	+	+	..	*+	..	..	.. ..	4	..	374
222. (4) <i>H. monodus</i> Att.	..	E/1	+	+	*+	..	..	..	.. ..	4	..	374
223. (5) <i>H. nigra</i> Att.	..	E/1	+	+	*+	..	..	..	.. ..	5	..	375
224. (6) <i>H. polyodus</i> Att.	..	E/1	+	+	*+	..	..	..	.. ..	4	..	375
225. (7) <i>H. alokopyga</i> Att.	..	E/1	+	..	*+	..	..	..	.. ..	4	..	375

Column	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
	Nov. spec.	Category.	Recorded for S. Africa before.	Present in the Museum Coll.	Distribution.					Description	in No. of the following literature list.	Page of the present paper.
					South Africa.				Further distribution.			
					Cape Province, Natal.	Kalahari-S. W. Africa.	Transvaal.	Matabeleland-S. Mozambique.				
226. (8) <i>Harpagophora dittoctenus</i> Att.	..	E/1	+	+	*+	..	..	..	..	5	..	375
227. (1) <i>Poratophilus australis</i> Silv.	..	E/1	+	..	..	..	..	..	..	9	..	378
228. (2) <i>P. diploodontus</i> n. sp.	..	E/1	..	..	..	..	+	..	..	..	+	378
229. (3) <i>P. punctatus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	378
230. (4) <i>P. robustus</i> n. sp.	..	E/1	..	+	+	+	..	..	..	..	+	379
231. (5) <i>P. sabulosus</i> n. sp.	..	E/2	..	+	+	+	..	..	..	..	+	380
232. (6) <i>P. brevilobatus</i> n. sp.	..	E/1	..	+	..	..	..	+	Mozambique	..	+	381
233. (7) <i>P. junodi</i> Carl	..	E/1	+	+	..	..	..	+	..	..	+	381
234. (8) <i>P. similis</i> Carl	..	E/2	+	+	..	..	*+	+	..	..	+	382
235. <i>Thyropygus orthurus</i> Silv.	..	E/1	+	..	*+	..	..	..	..	9	..	383
236. <i>Odontopyge bullata</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	..	388
237. <i>O. dolabrata</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	..	389
238. <i>O. durbanica</i> Att.	..	E/1	+	..	*+	..	..	..	..	..	+	390
239. <i>O. trifolia</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	391
240. <i>O. hereronia</i> Att.	..	E/1	+	..	..	*+	..	..	..	..	+	391
241. <i>Haplothysanus serratus</i> n. sp.	..	E/1	..	+	..	..	+	..	..	..	+	394
242. <i>H. modestus</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	..	394
243. <i>H. colosseus</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	+	395
244. <i>Spinotarsus lineatus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	397
245. <i>S. robustus</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	..	398
246. <i>S. striolatus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	399
247. <i>S. xanthonotus</i> Att.	..	E/1	+	..	..	*+	..	..	..	4	..	400
248. <i>S. tenuis</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	+	400
249. <i>S. castaneus</i> Att.	..	E/1	+	..	..	*+	..	..	..	4	..	401
250. <i>Patinatus</i> nov. <i>inermis</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	401
251. <i>Ardiophyllum</i> nov. <i>matabelinum</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	+	402
252. <i>A. debile</i> n. sp.	..	E/1	..	+	+	..	+	..	..	..	+	403
253. <i>A. liberale</i> n. sp.	..	E/1	..	+	..	..	+	..	..	..	+	404
254. <i>Storthophorus</i> nov. <i>delagoanus</i> n. sp.	..	E/1	..	+	..	..	..	..	..	..	+	406
255. <i>S. denticulatus</i> n. sp.	..	E/1	..	+	..	..	+	..	..	..	+	407
256. <i>S. levifrons</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	407
257. <i>S. vallatus</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	408
258. <i>Chaleponcus niger</i> Att.	..	E/1	+	..	..	..	..	..	..	5	..	410
259. <i>C. solitarius</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	+	410
260. <i>C. masienensis</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	..	411
261. <i>C. limbatus</i> Att.	..	E/1	+	+	..	*+	..	..	..	..	+	412
262. <i>C. acanthophorus</i> n. sp.	..	E/1	..	+	..	..	..	+	..	..	+	413
263. <i>Helicochetus dimidiatus</i> (Pet.)	..	A	+	..	..	..	..	*+	N. Mozambique, East Africa	5	..	414
264. <i>Solenozophyllum anoncopygum</i> Att.	..	E	+	..	..	..	..	..	..	5	..	414
COLOBOGNATHA.												
265. <i>Burenia</i> nov. <i>nasuta</i> n. sp.	..	E/1	..	+	+	..	..	..	..	..	+	418

LIST OF DOUBTFUL SPECIES.

<i>Scutigera capensis</i> Templeton.	<i>Spirostreptus cristulatus</i> Por.
<i>Scutigera rugosa</i> Newp.	<i>Spirostreptus flavofasciatus</i> Brdt.
<i>Trachycormocephalus mirabilis</i> Por.	<i>Spirostreptus gracilis</i> Brdt.
<i>Geophilus grandiceps</i> Por.	<i>Spirostreptus heros</i> Por.
<i>Sphaerotherium grossum</i> Koch.	<i>Spirostreptus laticollis</i> Brdt.
<i>Sphaerotherium lichtensteini</i> Brdt.	<i>Spirostreptus limbatus</i> Por.
<i>Sphaerotherium microstictum</i> Brdt.	<i>Spirostreptus melanopus</i> Por.
<i>Sphaerotherium monticola</i> Poc.	<i>Spirostreptus melanopygus</i> Brdt.
<i>Sphaerotherium nigrum</i> Butl.	<i>Spirostreptus notatus</i> Por.
<i>Sphaerotherium obtusum</i> Koch.	<i>Spirostreptus rotundatus</i> Brdt.
<i>Sphaerotherium pubescens</i> Por.	<i>Spirostreptus trigonyger</i> Brdt.
<i>Sphaerotherium punctatum</i> Brdt.	<i>Spirostreptus triplicatus</i> Brdt.
<i>Sphaerotherium rugulosum</i> Brdt.	<i>Spirostreptus validus</i> Brdt.
<i>Oligaspis puncticeps</i> Wood.	<i>Spirostreptus wahlbergi</i> Por.
<i>Strongylosoma cylindraceum capensis</i> Por.	<i>Spirostreptus attenuatus</i> Brdt.
<i>Strongylosoma punctatum</i> Att.	<i>Spirostreptus elevatus</i> Voges.
<i>Icosidesmus humberti</i> Por.	<i>Spirostreptus marginatus</i> Por.
<i>Spirobolus arcuosus</i> Por.	<i>Spirostreptus meinerti</i> Por.
<i>Spirobolus coriaceus</i> Por.	<i>Spirostreptus falcicollis</i> Por.
<i>Spirobolus digrammus</i> Poc.	<i>Spirostreptus flavifrons</i> Por.
<i>Spirobolus elegans</i> Brdt.	<i>Spirostreptus erythropareius</i> Por.
<i>Spirobolus formosus</i> Por.	<i>Alloporeus transvaalicus</i> Dad.
<i>Spirobolus litoralis</i> Koch.	<i>Odontopyge aequalis</i> Por.
<i>Spirobolus pococki</i> Por.	<i>Odontopyge bicuspidata</i> Brdt.
<i>Spirobolus sabulosoides</i> Por.	<i>Odontopyge binodifer</i> Voges.
<i>Spirobolus saussurei</i> Por.	<i>Odontopyge exquisita</i> Silv.
<i>Spirobolus strigosus</i> Por.	<i>Odontopyge flavotaeniata</i> Brdt.
<i>Spirobolus tessellatus</i> Por.	<i>Odontopyge foreolata</i> Por.
<i>Spirostreptus adumbratus</i> Por.	<i>Odontopyge gracilicornis</i> Brdt.
<i>Spirostreptus angulicollis</i> Karsh.	<i>Odontopyge jillae</i> Silv.
<i>Spirostreptus anodontus</i> Ck. and Coll.	<i>Odontopyge leptoproctus</i> Silv.
<i>Spirostreptus annulatus</i> Por.	<i>Odontopyge praetexta</i> Por.
<i>Spirostreptus brevicornis</i> Brdt.	<i>Odontopyge puncticauda</i> Por.
<i>Spirostreptus coarctatus</i> Por.	<i>Odontopyge pusilla</i> Dad.
<i>Spirostreptus corvinus</i> Koch.	

LIST OF WORKS CONTAINING DESCRIPTIONS NOT QUOTED IN THE PRESENT PAPER.*

1. ATTEMS, C., System der Polydesmidae I-II, Denkschr. Ak. Wiss. Wien, lxxvii, 1898; lxxviii, 1899.
2. ATTEMS, C., Neue Polydesmiden des Hamburg Mus., Mitt. Nat. Mus., xviii, 1901.
3. ATTEMS, C., Myr. Deutsch. Südpolar Exped., p. 90, ix, Zool., i, 1907.

* For full bibliography see p. 419.

4. ATTEMS, C., Myr. in L. Schultze Forschungsreise im W. und Centralen Süd-afrika, 1909.
5. ATTEMS, C., Afrikanische Spirostreptiden, Chun. Zool., xxv, 1914.
- 5a. ATTEMS, C., Wiss. Ergebn. R. Grauer Zentralafrika ; Ann. Nat. Mus. Wien, 1927.
6. COOK, C. F., Afric. Diplop. of the Fam. Gomphodesmidae, Proc. U.S.N. Mus., xxi, 1899.
7. HANSEN, The Gen. and Spec. of the Order Symphyla, Quart. J. Micr. Sci. (2), xlvii, 1903.
8. KRAEPELIN, K., Revision der Scolopendriden, Mitt. Nat. Mus. Hamburg, xx, 1913.
9. SILVESTRI, J., Neue Diplopoden, Abh. Ber. Kgl. Zool. Mus. Dresden, vi, 1897.
10. SILVESTRI, J., Redia I, 1903, II, Nuove specie di Paralamyctes.
11. SILVESTRI, J., Neue u. wenig bekannt. Myriop., Jahrb. Hamb. Wiss. Anst., xxiv, 1907.
12. SILVESTRI, J., Mat. per una revisione dei Diplop. Oniscomorpha, Boll. Lab. Zool. scuola sup. Portici, iv, 1910.

I. CLASS CHILOPODA, Latr.

While all authors are agreed that the Chilopods must be divided into four great orders (*Scutigeromorpha*, *Lithobiomorpha*, *Geophilomorpha*, *Scolopendromorpha*), the views concerning the affinity of these orders, and consequently the views concerning the classification to be adopted, are various. Haase, in 1880, divided the Chilopods into two groups, the *Anamorpha* (*Scutigeridae*, *Lithobiidae*) and *Epimorpha* (*Geophilidae*, *Scolopendridae*), according to the mode of development, i.e. with or without anamorphosis; and numerous authors have agreed with his convincing arguments. Pocock, in 1895, proposed another system, putting the *Scutigeridae* in one, and the three other orders in another group, naming these groups first *Anartiostigma* and *Artiostigma*, then *Notostigma* and *Pleurostigma*, according to the most striking character, namely, the position of the stigmata. It is true that the *Scutigeromorpha* are very different from the other *Chilopoda* in this and some other points, described in detail by Verhoeff, who alone, so far as I know, has hitherto accepted the views of Pocock. I agree with the system of Haase, because I believe that the division into *Anamorpha* and *Epimorpha*, according to the mode of development, is phylogenetically more ancient than the division into *Notostigma* and *Pleurostigma* founded upon anatomical characters. If a system is to have any soundness it must reflect our views relative to the affinities, and I believe that if out of four groups or orders two have the same mode of development (A), and two a different mode (B), we must admit that the two orders of

Group A are more nearly related to each other than Order A with one order of the Group B, even if the two orders of Group A show at the present day considerable but not fundamental anatomical differences. The differences between the *Scutigermorpha* and the remaining *Chilopoda* are not so great that they could not have been evolved within the branch of *Anamorpha* after the division into the primary branches *Anamorpha* and *Epimorpha* had taken place.

The classification of the Chilopoda adopted here is as follows :—

CLASS **CHILOPODA.**

1. Subclass **Anamorpha** Haase.

1. ORDER SCUTIGEROMORPHA Poc.

2. ORDER LITHOBIOMORPHA Poc.

1. Suborder LITHOBIOMORPHINAE Poc.

1. Sub-suborder LITHOBIOIDEA Newp.

1. Fam. HENICOPIDAE (Silvestri).

1. Subfam. HENICOPINAE Att.

1. Tribe *Henicopini* Chamb.

2. Tribe *Zygethobiini* Chamb.

2. Subfam. ANOPSOBIINAE Verh.

2. Fam. LITHOBIIDAE Newp.

2. Sub-suborder CERMATOBIOIDEA Haase.

2. Suborder CRATEROSTIGMCMORPHINAE Poc.

2. Subclass **Epimorpha** Haase.

1. ORDER SCOLOPENDROMORPHA Poc.

1. Fam. CRYPTOPIIDAE Kraep.

1. Subfam. CRYPTOPINAE Poc.

2. Subfam. THEATOPSINAE Verh.

3. Subfam. SCOLOLOCRYPTOPINAE Att.

2. Fam. SCOLOPENDRIDAE Poc.

1. Subfam. SCOLOPENDRINAE Kraep.

1. Tribe *Scolopendrini* Verh.

2. Tribe *Scolopendropsini* Verh.

3. Tribe *Asanadini* Verh.

2. Subfam. OTOSTIGMINAE Kraep.

2. ORDER GEOPHILOMORPHA.

1. Fam. HIMANTARIIDAE Ck.

2. Fam. ORYIDAE Ck.

3. Fam. MECISTOCEPHALIDAE Verh.

4. Fam. SCHENDYLIDAE Verh.
 1. Subfam. SCHENDYLINAE Ck.
 1. Tribe *Schendylini* Att.
 2. Tribe *Escaryini* Att.
 2. Subfam. BALLOPHILINAE Ck.
5. Fam. GOMBREGMATIDAE Ck.
6. Fam. GEOPHILIDAE Verh.
 1. Subfam. GEOPHILINAE Att.
 2. Subfam. DIGNATHODONTINAE Ck.
 3. Subfam. PACHYMERINAE Att.
 4. Subfam. CHILENOPHILINAE Att.
 5. Subfam. APHILODONTINAE Silv.
7. Fam. SONIPHILIDAE Chamb.
8. Fam. NEOGEOPHILIDAE Silv.
9. Fam. AZYGETHIDAE Chamb.
10. Fam. SOGONIDAE Chamb.

The system Pocock-Verhoeff, not adopted here, is treated in the following papers :—

1. Subclass *Artiostigma* Pocock, 1895, Biol. Centr. Amer., p. 3.
 Subclass *Pleurostigmophora* Verhoeff, 1901 Nova Acta Leop., lxxvii, p. 400.
 Subclass *Pleurostigma* Pocock, 1902, Quart. J. Micr. Sci., xlv, p. 442.
 Subclass *Pleurostigmophora* Verhoeff, 1907, Bronn's Class. u. Ordn., p. 251.
2. Subclass *Anartiostigma* Pocock, 1895, Biol. Centr. Amer., p. 1.
 Subclass *Notostigmophora* Verhoeff, 1901, Nova Acta Leop., lxxvii, p. 400.
 Subclass *Notostigma* Pocock, 1902, Quart. J. Micr. Sci., xlv, p. 445.
 Subclass *Notostigmophora* Verhoeff, 1907, Bronn's Class. u. Ordn., p. 223.

Although I cannot agree with the classification proposed by Verhoeff and must contradict him in some other points, I will not deny the great merits of Verhoeff's investigations into the structure of the Myriopods. Certainly it is his work which has made our knowledge as thorough and extensive as it is to-day. There is much in the present paper that is based on his work.

SYNOPSIS OF THE ORDERS OF CHILOPODA.

1. ANAMORPHA.

Nineteen segments with fifteen pairs of legs.

Seven or fewer segments with stigmata. Tracheae not anastomosing.

Some of the tergites are much reduced or have disappeared completely, so that the number of tergites is not more than eight.

The sternite and the coxae of the maxillipedes separated or a coxosternum with median suture.

The female has gonopods with spurs on the praegenital segment.

Intercalar tergites present only in *Craterostigmus*; praesternites never present.

The young leave the egg with seven pairs of legs. Development with hemianamorphosis.

A. Scutigeromorpha.

Tracheae opening by seven unpaired stomata on the middle of the dorsum near the posterior border of the tergites.

Tracheae not branched.

Eyes faceted.

The clypeus lying on the dorsal side; the mouth near the anterior end of the head.

Antennae composed of a short, indistinctly 2-jointed shaft and a long multiarticulate flagellum, divided by special joints into two or three portions.

First maxillae with a peculiar sense-organ.

Eight tergites.

B. Lithobiomorpha.

Tracheae opening by stigmata in the pleurae between the tergites and coxae.

Tracheae ramified.

Ocelli single, or in groups (no compound faceted eyes), or wanting.

The clypeus lying on the ventral side; the mouth remote from the anterior end of the head.

Antennae not divided into sections by special joints.

First maxillae without a peculiar sense-organ.

Fifteen tergites of different sizes, sometimes (*Craterostigmus*) six intercalar tergites.

2. EPIMORPHA.

Twenty-five or more segments with 21, 23, or 21-170 or more pairs of legs.

Nine or more pairs of stigmata. Tracheae anastomosing.

All main tergites of nearly the same size. The tergites often divided into main tergites and praetergites.

Praesternites always present.

Coxosternum of the maxillipedes without median suture.

The female has only small and unspurred gonopods on the praegenital segment, or none.

The young leave the egg with the full number of legs. Development with anamorphosis.

A. Scolopendromorpha.

Body robust, legs long, movements quick.

Antennae with 17-20 or more joints.

Four ocelli on each side, or none.

21 or 23 pedal segments.

9, 10, 11, or 19 pairs of stigmata.

Last legs strongly curved with a robust claw, except in *Alipes*, where they are racket-shaped and clawless.

B. Geophilomorpha.

Body very long and slender, worm-like, legs and antennae short, movements slow.

Antennae 14-jointed.

No eyes.

31-170 or more pedal segments.

All pedal segments except the first and the last with stigmata.

Last legs straight, and generally weak and resembling antennae.

Labrum and mandibles very different from the rest of the Chilopoda.

1. Subclass **Chilopoda Anamorpha** Haase.

1880. Haase, Schles. Chilop., i, p. 6.

1885. Meinert, Myr. Mus. Cantabr., Trans. Amer. Phil. Soc., p. 163.

1887. Haase, Indo-Austral. Chilop., p. 14.

1893. Bollman, Bull. U.S.A. Mus., No. 46, p. 164.

1895. Silvestri, Ann. Mus. Civ. Genova, 21, xlv, p. 622.

1908. Hennings, Zool. Ann., ii, p. 68.

1914. Attems, Indo-Austral. Myr., p. 87.

1. ORDER SCUTIGEROMORPHA Poc.

1895. Pocock, Biol. Centr. Amer., p. 1.

1902. Pocock, Quart. J. Micr. Sci., xliv, p. 447.

1907. Verhoeff, Bronn's Class. u. Ordn., p. 224.

The *Scutigeromorpha* are in some respects aberrant from all other *Chilopoda*, and the group has been defined in the same manner by all the writers from Leach, Gervais, to Haase, Latzel, Meinert, and the recent authors. Pocock and Verhoeff placed this group, as *Notostigmophora*, in opposition to the other three orders. The system of genera and species was put forward by Verhoeff, and we cannot do better than accept his systematic arrangement of the genera, the more so as nearly all the genera, excepting *Scutigera* and *Scutigerina*, were erected by him. Furthermore, the number of South African species is too restricted to justify a revision of the arrangement of the whole order. I can touch only upon single points.

Two species are represented in the collection of the Museum; the first is a subspecies of the well-known Palaearctic *Scutigera coleoptrata*; the second, *Scutigerina weberi*, was so badly described by its author that Verhoeff could not include it in his system. It belongs undoubtedly to the subfamily *Scutigerinae*, and represents a new tribe of this subfamily. If we accept the existing subfamilies, the characters distinguishing this genus from all other *Scutigerinae* are decidedly more important than the characters separating the tribes *Scutigerini*, *Ballonemini*, and *Thereuonemini*. These characters are, firstly, the male gonopods: low, blunt, pubescent cones, so rudimentary on the praegenital segment that they are nearly invisible, while they are slender styles in all hitherto known *Scutigerinae*. It seems to be similar in this respect to the *Pselliophorinae*, which I do not know. The position of the gonopods in *Scutigerina* and *Pselliophorinae* is different, however; in *Scutigerina* they are far apart on the sides of the segment, in the *Pselliophorinae* they are close together.

The second character is the absence of the longitudinal keeled edges of praefemur, femur, and tibia, which are present in all other *Scutigeromorpha*.

We divide, therefore, the *Scutigerinae* into two groups: *Scutigerinae* (with *Scutigerina*), and *Scutigerae* with three tribes, *Scutigerini*, *Ballonemini*, and *Thereuonemini*, with the admission that the limits of these three tribes are somewhat vague and that we do better not to adopt them. In his last paper on this subject

(Bronn's Class. u. Ordn.) Verhoeff distinguishes the tribes in the first case by the number of the joints of the first flagellum of the antennae, a character morphologically so insignificant that we can put a species with less than 90 joints with the *Ballonemini*, if all the remaining characters call for this position (Ribaut did it in the case of *Ballonema jeanneli*), or a species with more than 100 joints with the *Scutigerini* or the *Thereuonemini*. The second character used by Verhoeff is that of the spines on the tergites. Verhoeff says : *Ballonemini*, tergites beset with spine-bristles (Stachelborsten), without spines (Dornen) ; *Scutigerini* and *Thereuonemini*, with spines dispersed over the surface and serrate on the margins. These terms lead us to believe that the second group (*Scutigerini* and *Thereuonemini*) has no spine-bristles, but this is not correct. The position is that the *Ballonemini* have no spines, the other tribes have spines. Both groups have spine-bristles. I assume it to be agreed upon that the prominences of the chitin-skeleton must be divided into two groups : (1) simple rigid prominences—hairs, spiculae, and spines ; and (2) non-rigid prominences into which a nerve-ending enters—setae and spine-setae (spine-bristles)*. The spines are strongly thickened hairs. The *Ballonemini* possess spiculae besides the spine-bristles, therefore the difference between the *Ballonemini* and the other tribes is purely one of degree as regards the presence or absence of spines, the spiculae being nothing else than little spines.

The remaining characters used by Verhoeff, viz. tarsal papillae (Tarsalzapfen), tarsal spines (Tarsalstachel), are not general, and each distinguishes the *Ballonemini* only from a part of the other tribes.

Good characters for a further differentiation are the spines on the telopodites of the second maxillae and the hairs on the ventral side in *Scutigerina*, characters which are as good as unknown in the remaining genera.

We arrive at the following system :—

Fam. SCUTIGERIDAE Verh.

1. Subfam. SCUTIGERAE nov.

The male gonopods of both segments (praegenital and genital) are slender styles. Praefemur, femur, and tibia of the legs with sharp, longitudinal, spiny edges. The tergites with spines or spiculae.

* Cf. Verhoeff, Über Gattungen der Spinnenasseln. Ges. Naturforsch. Freunde, Berlin, 1904, p. 247.

1. Tribe *Scutigeri*.

The joints of the antennae much broader than long. Both pairs of male gonopods are slender, distant styles.

Key to the Genera of Scutigeri.

- 1a. Legs 6-14 with two spines on the first tarsus 2.
- 2a. Tergites without spines. Legs 1-14 with tarsal papillae *Ballonema* Verh.
- 2b. Tergites with spines. Legs 1-9 with tarsal papillae, legs 10-14 without papillae 3.
- 3a. On the tarsus of the anterior legs joints with large papillae of equal size alternate with joints without papillae *Scutigera* Lam.
- 3b. On the tarsus of the anterior legs joints with large papillae and joints with small papillae alternate . . . *Lassophora* Verh., *Diplacrophor* Chamb.
- 1b. All legs without tarsal spines 4.
- 4a. Tergites with numerous long needle-like hairs . . . *Thereuonema* Verh.
- 4b. Hairs short, conical, or wanting 5.
- 5a. Tergites without hairs but with numerous spines and short spine-bristles
Tachythereua Verh.
- 5b. Tergites with hairs between the stouter spines and bristles 6.
- 6a. The sides of the basal joints of the syntelopodite of the female gonopod are parallel; the sinus between the terminal branches is narrow, elliptical . . 7.
- 7a. The surface of the last 2 tergites and the lateral border of the last 3 tergites beset with spines; the spine-bristles, if present, not longer than the spines
Allothereua Verh.
- 7b. The last tergites with numerous spine-bristles; the spines, if present, at most half as long as the spine-bristles . . . *Parascutigera* Verh.
- 6b. The basal joints of the female gonopods are much enlarged distally; the sinus between the terminal branches a very broad semicircle 8.
- 8a. The terminal branches of the female gonopod distinctly separated from the basal coalesced part *Prionopodella* Verh.
- 8b. The terminal branch of the female gonopod not separated from the basal coalesced part 9.
- 9a. The border of tergites 6 and 7 with strong spines forming a saw . . . 10.
- 10a. The area surrounding the stomata of tergites 6 and 7 with 12 + 12 or more strong spines. Stomata 6 and 7 oblong . . . *Thereuopoda* Verh.
- 10b. The area surrounding the stomata without spines. Stomata 6 and 7 very short *Prothereua* Verh.
- 9b. Spine-bristles preponderating on the border of tergites 6 and 7; between them short spines not forming a saw
Thereuopodina Verh., *Podotherua* Verh.

2. Tribe *Pselliophori*.

The joints of the antennae are as broad as long or longer than broad. The gonopods of the male praegenital segment are broad, lamelliform, and touch one another (*Pselliophora* Verh., *Sphendononema* Verh.).

2. Subfam. SCUTIGERININAE nov.

The male gonopods are low, blunt cones, scarcely visible on the praegenital segment, a little larger on the genital segment. Praefemur, femur, and tibia without sharp longitudinal edges, tergites without spines or hairs, only spine-bristles (*Scutigera* Silv.).

Gen. SCUTIGERA Lam.

1. *Scutigera coleoprata natalensis* Verh.

1905. Verhoeff, Über Scutigeriden, Zool. Anz., xxix, pp. 77, 83.

(Pl. XVIII, fig. 433; text-fig. 1.)

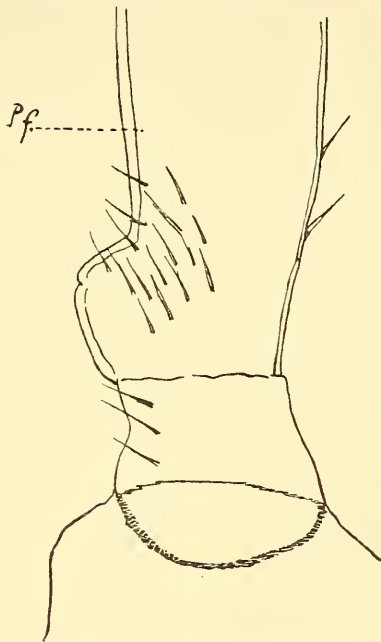
In the paper cited above, Verhoeff has erected four subspecies of *Scutigera coleoprata*. The specimens examined by me belong to the group of *Scutigera coleoprata*, but they combine characters of Verhoeff's subspecies *natalensis* with characters of other subspecies.

The tarsus of the first leg has 14+31-34 joints. The tarsobasale of the sixth leg has 5 spines, of the ninth leg 8 spines, of the eleventh leg 14 spines; the remaining joints of the first tarsale of the eleventh leg have 11 spines altogether.

The tarsal papillae on the first leg are present on the following joints: 7, 9, 11, 13, 19, 25 (second tarsus 34-jointed); or 10, 12, 14, 16, 18, 20, 22, 24, 26 (second tarsus 33-jointed); or 10, 12, 14, 15, 16, 18, 20, 22, 24, 26 (second tarsus 31-jointed).

The tarsus of the second leg has 12-14+28-31 joints (first and second tarsus); the number of joints and the distribution of the papillae are variable, not only in different specimens but also on the right and left leg. For example, right leg, first tarsus 13-jointed, second tarsus 28-jointed, with papillae on joints 10, 12, 14, 16, 18, 20, 22, 24; left leg, first tarsus 12-jointed, second tarsus 29-jointed, with papillae on joints 8, 10, 12, 14, 16, 18, 20, 21, 22. Another example has: first tarsus 14-jointed, second tarsus 31-jointed, with papillae on joints 9, 11, 13, 15, 17, 19, 21, 23, 25; third leg, first tarsus 13-jointed, second tarsus 32-jointed, papillae on segments 10, 12, 14, 16, 18; fourth leg, first tarsus 11-jointed, second tarsus 30-jointed, papillae on segments 8, 10, 12, 14, 16, 22, 24. First to third pairs without tarsal spines on the upper side of the first tarsus; fourth pair with one, sixth and following pairs with two. Margins of the sixth tergite with 21 spines on each side; seventh tergite with 11+13 spines; first flagellum of antenna with about 70 joints.

The above shows that the value of the number of tarsal joints and the distribution of the papillae is problematical. I refer the South African specimen examined by me to the subspecies *natalensis* Verh. on account of the relatively numerous spines on the margins of tergites 6 and 7, and because the papillose and non-papillose tarsal joints do not alternate regularly, sometimes three papillose joints following one another. As to the three remaining subspecies, as I have no means or desire to check the number of spines and joints, I must leave the responsibility for the same to Verhoeff. After a more exact examination of all forms we shall probably see more clearly the extent of individual variability relative to spines, number of tarsal joints, distribution of papillae, etc., and it will be possible to distinguish limited geographical subspecies with greater certainty.



TEXT-FIG. 1.—*Scutigera coleoptrata natalensis* Verh. Praefemur of second maxilla.

Respecting the genital region we must note that in the male (fig. 433) no tergite is visible, the tergite of the fifteenth pair of legs (*T.XV*) and the telson being immediately contiguous. On the ventral side the large sternite of the praegenital segment (*vp*) is visible behind the sternite of the

fifteenth pair of legs (*v.XV*), bearing two slender styles (*Gp*) on the sides of its posterior margin; and between the praegenital sternite and the telson the very small genital segment (*b*) with its styles is visible (*bg*).

In the telson we can distinguish three pubescent plates, but they are connected by thin membranes, especially the "subanal plates" (Verhoeff). In the praefemur of the second maxillae the rounded prominence (the opening of a gland) is more distinctly visible than in *Scutigerina* (text-fig. 1).

Cape Province.—Cape Town, in houses (1527, 1528, 1663, 1665); Signal Hill (7664); Newlands (1590, 7623); St. James (150125);

Kalk Bay (1574) ; Paarl (1664) ; Hanover (7772, 7773) ; East London (1695). *Natal*.—Durban (7609) ; Richmond (7374).

Scutigera capensis Templeton.

1871. Porat, Öfvers. Vet. Ak. Förh., Nr. 9, p. 1137.
Caffraria, Damaraland, Walfish Bay.

Scutigera rugosa Newp.

1871. Porat, *loc. cit.*, p. 1138.
Caffraria, Caput bonae Spei.

Since the publication of Verhoeff's work the descriptions of the above two species, which include none of the characters recognised as important to-day, are useless.

Gen. SCUTIGERINA Silv.

1903. Silvestri, Redia, i, p. 254.

Legs without sharp longitudinal keels ; first tarsus from the third or fourth pairs of legs with one or two spines distally. All 15 pairs with 2 spines at the end of the tibia, one superior and one inferior. Second tarsus of pairs 1–14 with papillae.

First flagellum of the antenna 66–70-jointed. Tergites with spine-bristles, without hairs and spines.

The coxae of all legs, the last sternites and the genital region with microscopical hairs, arranged in pairs. Tibia of second maxillae without spines. Stomata narrow, elongated. The male genital appendages of the praegenital segment are low, pubescent, widely separated little knobs ; the appendages of the genital segment are somewhat larger, and are next to similar cones just behind the praegenital cones. The joints of the antenna are broader than long. The terminal joint of the female genital appendages is separated from the preceding joint by a distinct suture.

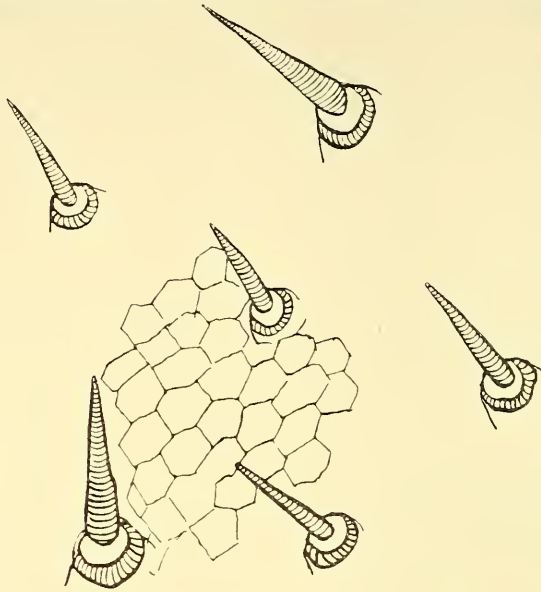
2. *Scutigera weberi* Silv.

1903. Silvestri, Redia, i, p. 224.

(Pl. XVIII, figs. 434–443 ; text-figs. 2–10.)

Colour brownish, the sides and a median band of the dorsum and the legs green. (The specimens that have remained a long time in bad alcohol are a uniform dirty brown.) Length up to 20 mm.

First flagellum of the antenna 66-70-jointed, the joints broader than long, with numerous hairs and, intermixed with them, strong tactile



TEXT-FIG. 2.—*Scutigera weberi* Silv. Bristles of tergite.

bristles occurring singly. Antennae relatively short. Tergites evenly covered with short spine-bristles (text-fig. 2), without hairs, etc.



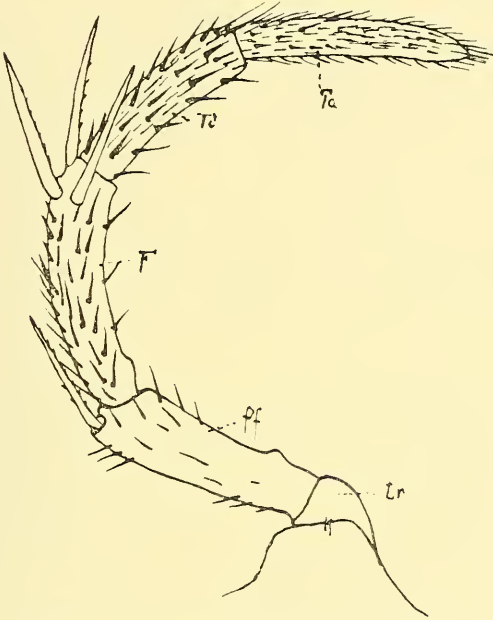
TEXT-FIG. 3.—*Scutigera weberi* Silv.
Stoma of sixth tergite.

Stomata (text-fig. 3) narrow.

The sternites of the segments 2-14 are fairly deeply set and roundly sinuate behind, the surface with dispersed, the margin with dense, tactile bristles; the sternites of some of the last segments are, in addition, covered with numerous minute hairs, arranged generally in pairs. The labrum and the mandibles agree completely with those of *Scutigera*. The sternite of the first maxillae (v, fig. 436) is a

narrow band, twice sinuate on each side and completely separated from the coxae. In the drawing of *Scutigera* by Verhoeff (Bronn's

Class. u. Ordn., Taf. xxii, fig. 23) the sternite is not visible, and it would seem that he had not seen it, as he speaks of a "coxosternum." There cannot be any question of a coxosternum, the coxae being completely separated one from the other and both from the sternite. Each coxa (*Co*) has a large median process, the top of which is separated from the base by a fold (fig. 434). Next to this transverse fold is a small narrow lobe. At the



TEXT-FIG. 4.—*Scutigera weberi* Silv. Telopodite of second maxilla.



TEXT-FIG. 5.—*Scutigera weberi* Silv. Spine from femur of second maxilla.

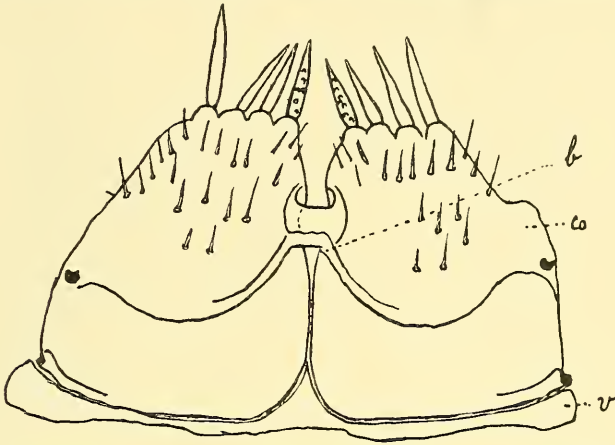
top of the process are four large brush-like bristles, similar to those on the terminal joint of the telopodite, and some small bristles. The telopodite is 3-jointed. Latzel (1880) described it as being so, but Verhoeff (Bronn's Class. u. Ordn., p. 163) doubts the correctness of Latzel, and thinks that what he called the middle joint is identical with a darker coloured basal strip of the terminal joint. The dark zone mentioned by Verhoeff is actually present, but the boundaries of this zone do not coincide with those of the joints. The fine sutures between the first (I) and second (II), and between the second and third (III) joints are distinctly visible (fig. 436) if the lens is suitably

focussed. The first and second telopodite joint bear only few tactile bristles; the terminal joint has more, and on the median side several brush-like bristles as well. The basal part of these bristles is dark-coloured, and enters somewhat into the chitinous pad bearing the bristles. The colour changes abruptly. The terminal part is pale, somewhat irregularly arcuate, first blunt and smooth, then beset with dense, fine hairs, all directed medially, and form an exquisite cleaning organ for the antennae and the tarsi (fig. 435).

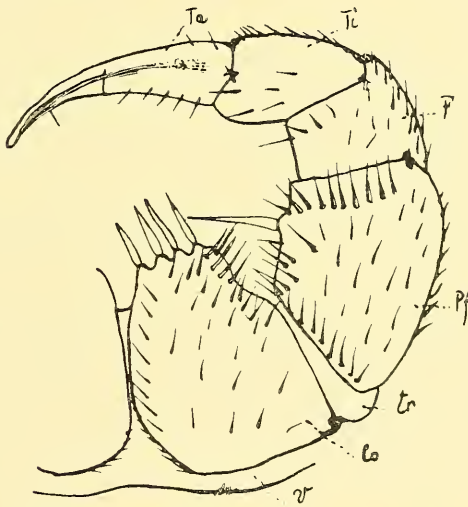
Second maxillae (text-figs. 4, 5) with sternite and coxae weakly chitinised, colourless, the sutures visible with difficulty. The two halves are scarcely connected in the middle. Two condyles between coxa and trochanter, one ventral and one dorsal. The telopodite is 5-jointed, and consists of a very short trochanter and four joints of the same size, praefemur, femur, tibia, tarsus. The praefemur (fig. 438) has a little prominence on the under side near the base. It seems to be the opening of a gland; the mass of this gland is visible in the interior of the joint close to the wall, distally and proximally to the opening. Praefemur with one dorsal spine, femur with four spines (dorsal, lateral, and ventral), tibia not spined, thus differing from *Scutigera*. The large spines are beset with little lateral points (text-fig. 5). Sternite and coxae of toxicognaths (text-figs. 6, 7) not coalesced. The sternite (*v*) is a small band embracing the whole base of the coxae. The dorsal wall of the coxa (*Co*) is much shorter than the ventral wall; the free margin of the dorsal wall is arcuate. The two dorsal walls are connected by a bridge (text-fig. 6, *b*). Verhoeff, in Bronn's Class. u. Ordn., Taf. iii, fig. 6, indicates this bridge as sternite, and does not draw the true sternite. The margin of the coxa bears four movable spines based on little protuberances, corresponding to the teeth of other Chilopods. The median tooth has little round tubercles. On the dorsal and ventral surface of the coxae are some tactile bristles. The condyles (2) are situated on the lateral side. The trochanter is an independent short joint. No condyle between trochanter and praefemur. Between praefemur and femur one dorsal and one lateral condyle, between femur and tibia and between tibia and tarsus one lateral and one ventral condyle. The praefemur below bears one large movable seta springing from a little protuberance (text-fig. 8). All the joints have numerous tactile bristles. Ordinary fine hairs densely cover the under side of the tarsus. The suture between tarsus and ungulum is interrupted before reaching the dorsal wall; thus these joints are partially fused.

The first and second pairs of legs with short tactile bristles on prae-

femur and femur ; from the third pair the femur is provided besides with fine hairs. Tibia of the first pair with tactile bristles ; from



TEXT-FIG. 6.—*Scutigera weberi* Silv. Maxillipedes, dorsal view.



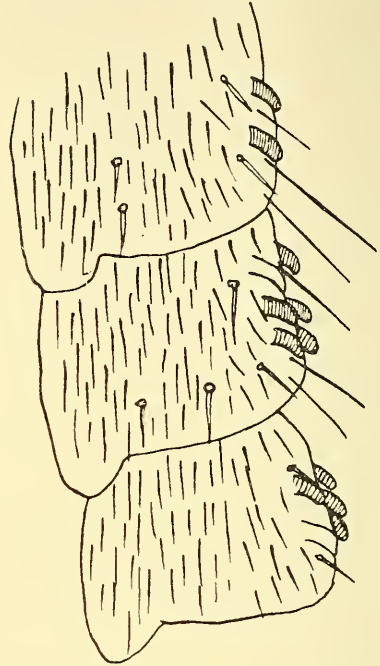
TEXT-FIG. 7.—*Scutigera weberi* Silv. Maxillipedes, ventral view.

the second pair onwards with tactile bristles and hairs. On the distal margin of the tibia a circle of dense stiff hairs (fig. 437) ; the coxae of all legs have one large seta and are densely covered with microscopical hairs in both sexes. The second tarsus with papillae (text-fig. 9)

on the joints, excepting the first four and the last one to three joints. Generally there are two papillae on each joint, but they increase in number on the posterior legs; the fourteenth pair bears six papillae



TEXT-FIG. 8.—*Scutigera weberi* Silv. Spines of praefemur of maxillipede.



TEXT-FIG. 9.—*Scutigera weberi* Silv. Three joints of second tarsus of twelfth leg.

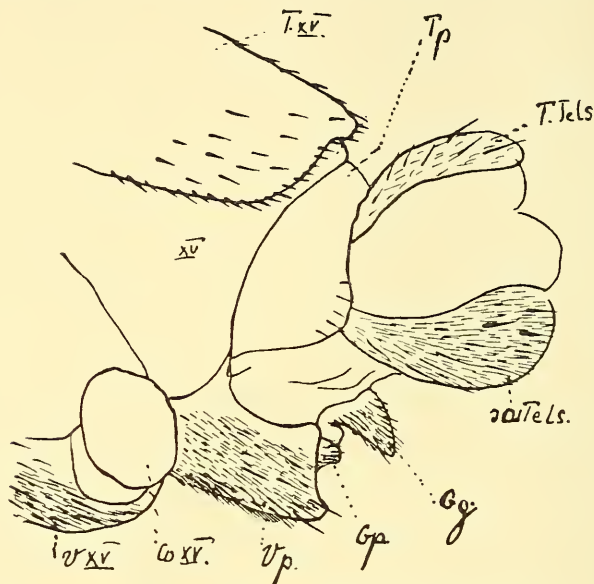
in two rows of three each on each joint; but there are also joints with 1+2, 2+2, 2+3, 3+3 papillae on the same tarsus. The row of papilla-bearing joints is not interrupted (in *Scutigera* these joints alternate). The first and second tarsus is densely covered with hairs and single tactile bristles.

	Number of spines on			Terminal spines on first tarsus.	Number of joints.	
	Praefemur.	Femur.	Tibia.		First tarsus.	Second tarsus.
Leg 1	1—0—1*	1—1—0	1—0—1	0	9—10	24—25
„ 2	2—0—1	1—1—0	1—0—1	0	7—8	23—24
„ 3	2—0—1	1—1—0	1—0—1	0—1	6—8	20—23
„ 4	2—0—1	1—1—0	1—0—1	1	6—7	23
„ 5	2—0—1	1—1—0	1—0—1	1	6—7	22
„ 6	2—0—1	1—1—0	1—0—1	1—2	5—6	21
„ 7	2—0—1	1—1—0	1—0—1	1—2	6	21
„ 8	2—0—1	1—1—0	1—0—1	1—2	5—6	21—22
„ 9	2—0—1	1—1—0	1—0—1	1—2	4—5	21—22
„ 10	2—0—1	1—2—0	1—0—1	2	4—6	22
„ 11	2—0—1	1—2—0	1—0—1	2	4—5	21—22
„ 12	2—0—1	1—2—0	1—0—1	2	5—6	23—24
„ 13	2—0—1	1—2—0	1—0—1	2	4—6	23—24
„ 14	2—0—1	1—2—0	1—0—1	2	5—7	26—27
„ 15	1—0—1	1—2—0	1—0—1	0		

The sharp keels, well known in all other *Scutigromorpha*, are completely wanting in *Scutigerina*. This character, indicated by Silvestri, is the single one which permits identification of his description, which is insufficient in all other points. Though the keels are wanting, they are made up for by the disposition of the bristles and spines, arranged sometimes in longitudinal rows. The praegenital segment in the sense given by Heymons is well developed in both sexes, yet the genital segment itself is very rudimentary (text-fig. 10). Looking at a male from above (fig. 439), we see between the fifteenth segment and the telson (*T. Tels*) a short segment (*Tp*), the praegenital segment. On the ventral side this segment is much longer (*vp*, fig. 440); behind a transverse edge it is abruptly declivous, and the posterior surface formed by this declivity bears a little callosity with two low, pubescent, blunt cones, the gonopods. Behind this callosity a second similar one is visible, bearing two somewhat larger cones, the rest of the genital segment (fig. 443). On the dorsal side the genital segment is completely suppressed. The praegenital segment is almost hairless dorsally; ventrally it bears numerous strong tactile bristles, and the above-described peculiar minute hairs arranged in pairs.

* Signifies one dorsal spine, no lateral, one ventral.

The tergite of the praegenital segment (*Tp*, fig. 441) of the female is broad, partially pubescent, and connected with the preceding tergite of the fifteenth segment by a broad, membranous, hairless strip continued round the whole segment and therefore visible also on the ventral side (*sk*, fig. 442). The sternite of the praegenital segment (*v.pg*) is long, rectangular, situated between the large coxae of the gonopods (*cog*). I agree with the interpretation of Verhoeff relative to these parts. The telopodite of the gonopods (*tely*) is 2-jointed;



TEXT-FIG. 10.—*Scutigera weberi* Silv. Posterior end of ♂.

the basal joints are coalescent in their basal half, and they are inserted in the posterior margin of the sternite and in the coxa. The shape is the same as in *Scutigera*, with a bundle of bristles on the inside of the basal joint and a row of twelve teeth on the inside of the terminal joint. The female genital aperture is completely concealed by the gonopods, which are directed backwards and overlap the whole genital segment; the rest of this segment merely forms the margin of the large transverse aperture.

The telson is the same in both sexes, and consists of a densely pubescent tergite (*T.Tels*) and two subanal plates (*sa.Tels*) connected by thin hairless membranes.

Cape Province.—Table Mt. (7627); Signal Hill (7664, 7665, 150110);

Slopes of Camps Bay (7736, 7731); Newlands (7638); Kirstenbosch (7634); Bergvliet (7706); St. James (7712, 150102, 7711); Hout Bay (7760); Venster Ravine, Table Mt. (7371); Platteklip, Table Mt. (B. 980); Simonstown (150157); Sir Lowry's Pass (7303); Houw Hoek (7354); Caledon (14649, A. 23341); Paarl (7471); Wellington (13497); Gt. Winterhoek Mts. (B. 2232); Brandvlei, Worcester (1690); Worcester (14645); Clanwilliam (7577). *Natal*.—Malanga (B. 3381, B. 3380). *Transvaal*.—Johannesburg (7503, 1588). *Rhodesia*.—Umtali (13732).

2. ORDER LITHOBIOMORPHA Poc.

1893. Order *Anamorpha*, suborder *Unguipalpi* Bollmann, Bull. U.S. Nat. Mus., No. 46, p. 164.

1895. Order *Lithobiomorpha* Pocock, Biol. Centr. Amer., p. 3.

1902. Order *Lithobiomorpha* Pocock, Quart. J. Micr. Sci., xlv, p. 445.

1907. Order *Anamorpha* Verhoeff, Bronn's Class. u. Ordn., p. 231.

1914. Order *Unguipalpi* Attems, Indo-Austral. Myr., p. 91.

The tracheae open by pairs of stigmata in the pleurites between tergite and coxa. There are two to seven pairs of stigmata on pedal segments [1], 3, [5], [8], 10, [12], [14]. The tracheae are ramified. Antennae short or long, but not divided into sections. Single ocelli, groups of ocelli, or eyes wanting. First pair of maxillae without peculiar sense organ. Toxicognaths with sternocoxal plate; the telopodite consisting of one large femur, two little joints, and the tarsungulum. Fifteen tergites, sometimes with intercalary tergites before Nos. 3, 5, 7, 8, 10, 12, so that altogether there may be 21 tergites, but always 15 pairs of legs. Male bearing 1-4-jointed gonopods on the praegenital segment. The tarsi generally 1-3-jointed; in rare cases all tarsi, or the tarsi of the fifteenth pair only, multiarticulate.

Bollmann was the first author to divide the *Anamorpha* into two clearly defined subgroups; the characters used by Bollmann are nearly the same as are used to-day and we have properly no reason to discard the name, as several authors have done. The *Lithobiomorpha* Pocock, 1895 and 1902, are not identical with the *Anamorpha*; they include the *Lithobiidae* and *Cermatobiidae*, but not the *Craterostigmomorpha* published in the second paper in 1902. In this paper Pocock divides the *Pleurostigma* (see above) into four orders: *Scolopendromorpha*, *Geophilomorpha*, *Craterostigmomorpha*, and *Lithobiomorpha*. On the contrary, the classification of Bollmann, 1893, who had not seen the

Craterostigmomorpha published in 1902, places them amongst the *Unguipalpi*. The *Anamorpha* of Verhoeff are not identical with the *Anamorpha* Haase, and as used by myself, including only the *Lithobiidae* and not the *Scutigerae* of Haase. They are on the contrary identical with the *Unguipalpi* as defined here.

1. Suborder LITHOBIOMORPHINAE Poc.

1907. Suborder *Lithobiomorpha* Verhoeff, Bronn's Class. u. Ordn., p. 233.

1914. Suborder *Lithobiomorpha* Attems, Indo-Austral. Myr., p. 91.

Fifteen tergites. No intercalary tergites; tergites of the pedal segments 2, 4, 6, 9, 11, 13 much smaller than the others. Pleurites weak, no specially large praecoxal pleurite. The sternites, pleurites, and tergites of pedal segments 12-15 not fused. Genital and anal region distinctly separated, gonopods present in both sexes. Coxal pores present or wanting. Toxicognath not or scarcely visible from above. Antenna with 13 to over 100 joints.

1. Sub-suborder LITHOBIOIDEA Newp.

1844. Fam. *Lithobiidae* Newport, Trans. Linn. Soc., xix, pp. 275, 360.

1868. Fam. *Lithobiidae* Meinert, Nat. Tidsskr., (3), v, p. 247.

1880. Fam. *Lithobiidae* Haase, Schles. Chil., i, p. 12.

1880. Fam. *Lithobiidae* Latzel, Myr. Ost. Ung. Mon., i, p. 30.

1883. Fam. *Lithobiidae* Bollmann, Bull. U.S. Nat. Mus., No. 46, p. 164.

1907. Fam. *Lithobiidae* Verhoeff, Bronn's Class. u. Ordn., p. 234.

Antennae with 13 to 100 or more joints; antennae shorter or longer than the body. Eyes either wanting, or one single ocellus, or several ocelli in a group. In front of and beneath the eyes one groove-shaped organ. Labrum with one median tooth, the margin generally beset with crescent-shaped bristles. Mandible with four groups of paired teeth, a row of sickle-shaped bristles, and one hair-pad, generally with a row of bifid bristles next to the sickle-shaped bristles and the tooth.

First maxillae: the small triangular sternite and the coxae are more or less coalesced. Sometimes they are separate, sometimes completely fused. The coxae have a large process on the median side of the telopodite. Telopodite 2-jointed, the basal joint some-

times coalesced with the neighbouring parts of the coxa. The distal joint beset with simple ramifying bristles. No condyles. Second maxillae: sternite and coxae coalesced; the limits of the component parts hardly visible. Two condyles between coxa and telopodite, one dorsal and one ventral. Telopodite 3-4-jointed; the trochanter and praefemur generally fused, but in some cases not; the suture persisting as a trochanter-notch. Terminal joint with simple and branched bristles. The claw bears 3-5 lobes. The tergite of the toxicognath is a more or less broad buckle or clasp. The sternite is completely invisible; the pleurites in the *Henicopidae* form with the tergite a closed circle separating the toxicognaths from the first foot-bearing segment. In the *Lithobiidae* the coxae of the toxicognaths touch the sternite of the first foot-bearing segment. The toxicognaths consist of the syncoxite, the anterior border of which is generally toothed, and the 4-jointed telopodites. Tergites of pedal segments 2, 4, 6, 8, 11, and 13 are smaller than the remaining tergites, but are visible in the middle line. The posterior border, especially of tergites 9, 11, and 13, may be rounded, or more or less dentiform. Stigmata may be present on segments 1, 3, 5, 8, 10, 12, 14, or they may be wanting on one or several of them. They are present to the number of 2-7 pairs. The coxae of 2-5 of the last legs are provided with glands opening by one or several pores in one row, or scattered.

Tarsus of pairs 1-12, 1- or 2-jointed. Pairs 13-15, 1-6-jointed; the second joint of the fifteenth pair has exceptionally a large number of articulations. Often the tarsi of pairs 13-15 have one joint more than the remaining legs. Spines are present on the legs, or wanting; their disposition is regular and of importance for the systematist. In the genital region, only one tergite and one sternite belonging to the praegenital segment are present. The genital segment is rudimentary, and visible only on the ventral side in the neighbourhood of the genital aperture (a distinct genital segment is not visible). The sternite and tergite of the praegenital segment are connected with the fifteenth segment and the telson by membranes, more or less visible according to the amount of contraction of the body. The posterior border of the tergite is sometimes sinuate, like the tergites of foot-bearing segments. The sternites are generally united; in some *Henicopidae* divided into two plates separated by a median suture. The female has 1-4-jointed genital appendages; the male has 3-jointed appendages, the last joint bearing a large claw corresponding to one joint, so that it is more correct to say the appendages are 4-jointed; the basal joint has two, seldom one or more than two

spurs. The telson in the young bears two glands, which may remain or disappear in the adult.

After having once more examined all the facts, I am now convinced that it is better to consider the *Anopsobiidae* as a subgroup of the *Henicopidae*. Both are connected by several remarkable characters not present in the other *Lithobioidea*, while the differences between the *Henicopidae* and *Anopsobiidae* are less important; and we must presume that the division of the common ancestors into *Lithobiidae* and *Henicopidae* is the more ancient, and that after this division the branch *Henicopidae* was redivided into *Henicopininae* and *Anopsobiinae*.

The position given by Verhoeff to the *Anopsobiidae*, as a third group beside the *Lithobiidae* and *Henicopidae* and of the same rank with these, is partially due to the incorrect statements of Silvestri concerning the *Anopsobiidae*, and we cannot concur in this view.

Synopsis of the Families of Lithobioidea.

- 1a. The pleurites of the toxicognath-segment do not touch on the ventral side and do not separate the toxicognath from the first pedal segment. Genital appendages of male 1- or 2-jointed Fam. *Lithobiidae*.
- 1b. The pleurites of the toxicognath-segment are united on the ventral side, forming a band separating the toxicognath and the first pedal segment. Genital appendages of male 4-jointed Fam. *Henicopidae* 2.
- 2a. Antennae with 19 or more joints. The coxal pores present on segments 13, 14, 15, sometimes also on 12 and 11. Coxae of last legs without lobate process Subfam. *Henicopininae* 3.
- 3a. First pedal segment with a pair of stigmata Tribe *Henicopini*, Chamb.
- 3b. First pedal segment without stigmata Tribe *Zygethobiini*, Chamb.
- 2b. Antennae with 13-17 joints. Coxal pores on segments 14 and 15. Coxa of last legs with long lobate process ending in a small spine
Subfam. *Anopsobiinae*.

Fam. HENICOPIDAE Poc.*

- 1901. Fam. *Henicopidae* Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 448.
- 1907. Tribe *Henicopini*, Verhoeff, Bronn's Class. u. Ordn., p. 238.
- 1909. Fam. *Henicopidae* Attems, Schultze's Forsch. Reise, p. 5.
- 1911. Fam. *Henicopidae* Attems, Fauna S.W. Austral., iii, p. 153.
- 1912. Fam. *Henicopidae* Chamberlin, Bull. Mus. Comp. Zool. Harvard Coll., lvii, p. 4.
- 1914. Subfam. *Henicopininae* Attems, Indo-Austral. Myr., p. 91.

* I take the opportunity here of giving a short synopsis of all *Henicopidae*, hitherto wanting in the literature.

The pleurites of the toxicognath segments are connected on the ventral side with a band separating the coxosternum of the toxicognaths and the sternite of the first pedigerous segment.

The genital appendages of the male are 4-jointed, the terminal joint long, bristle-like, with minute lateral hairs. Tibia of pairs of legs 1-11, sometimes also of pairs 12-14, with a tooth-like process on the top of the lateral side. The sides of the labrum not incised. Anal glands persisting in the adults. Thirteen or more antennal joints. Number of ocelli generally 1 to 3, rarely as many as 8, sometimes wanting altogether. Stigmata present on pedal segments 1, 3, 5, 8, 10, 12, 14, or 3, 5, 8, 10, 12, 14, or 3, 10, 12, or 3, 10. Spines on legs present in small numbers if at all.

1. Subfam. HENICOPINAE Att.

The coxal pores begin on pairs of legs 11, 12, or 13, therefore always present on legs 13 to 15. Number of joints of the antennae 19 or more. The coxae of the last pair of legs without lobate process. The basal joint of the telopodite of the first maxillae is fused on the inner side with the neighbouring parts of the coxae. Generally 1 to 3 ocelli. Eyes rarely wanting. Stigmata generally on segments 1, 3, 5, 8, 10, 12, 14, rarely on 3, 5, 8, 10, 12, 14. Tarsus of legs 1-13, 1-3-jointed; legs 14 and 15, 1-6-jointed. The second joint of the tarsus of the 15th pair of legs sometimes divided into numerous joints.

1. Tribe *Henicopini*, Chamb.

1912. *Henicopinae* Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 5.

1914. Tribe *Henicopini* Attems, Indo-Austral. Myr., p. 91.

First segment with a pair of stigmata; generally 1-3, rarely to 8, or no ocelli on each side.

Synopsis of the Genera of Henicopini.

- 1a. No coxal pores on the twelfth pair of legs; pairs 13-15 with 3 pores each.
Eight ocelli on each side. *Triporebius* Silv.
- 1b. Pairs of legs 12-15 with coxal pores. None to three ocelli on each side. 2
- 2a. Each coxa of the last four pairs with one pore. The fifteenth pair of legs much shorter than the fourteenth pair, its tarsus 1-jointed. Tarsus of fourteenth 2-jointed. *Haasiella* Poc.
- 2b. More than one coxal pore on some or all of the last four pairs. Fifteenth pair of legs longer than the fourteenth. Tarsus of fifteenth 2-jointed. 3
- 3a. Basal joint of the female genital appendages with 5-6 saw-like teeth. No inferior claws on the legs. *Lamycopristus* nov. gen.

- 3b. Basal joint of the female genital appendages with two or three style-shaped spurs. Generally one or two spinules in addition to the claw of the legs . . . 4.
- 4a. Tarsus of legs 1-13, 3-jointed; tarsus 14, 4- to 6-jointed; tarsus 15, 5- or 6-jointed *Henicops* Newp.
- 4b. Tarsi 1-13, 1- or 2-jointed 5.
- 5a. Tarsi 1-15, 2-jointed *Paralamyctes* Poc.
- 5b. Tarsi 1-12, 1-jointed 6.
- 6a. Tarsus 15 divided into numerous secondary joints. *Pleotarsobius* Att.
- 6b. Tarsus 15, 2-jointed 7.
- 7a. Tarsus 13, 1-jointed. Three ocelli on each side. Antennae 20-21-jointed. Legs 14 and 15 of male considerably thickened. Claw with one spinule
Marcianella Att.
- 7b. Tarsus 13, 2-jointed. One ocellus on each side, or none. Antennae with 19-46 joints. Claw with two spinules 8.
- 8a. Antennae 19-21-jointed; coxa of maxillipedes with 4-6 teeth
Wailamyctes Archey.
- 8b. Antennae 24- or more jointed; coxa of maxillipedes with 2 or 3 teeth . . . 9.
- 9a. One ocellus on each side *Lamyctes* Mein.
- 9b. No eyes *Lamyctinus* Silv.

Gen. LAMYCTES Mein.

1868. *Lamyctes* Meinert, Naturh. Tidsskr., v, p. 266.

1880. *Henicops* Latzel, Myr. Ost. Ung. Mon., i, p. 132.

1887. *Henicops* Haase, Indo-Austral. Chilop., p. 35.

1901. *Lamyctes* Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 449.

1907. *Lamyctes* Verhoeff, Bronn's Class. u. Ordn., v, p. 238.

1908. *Lamyctes* Attems, Myr. Deutsche Südpolar Exp., p. 420.

1909. *Lamyctes* Attems, Schultze's Forsch. Reise D. S.W. Afr., p. 5.

1912. *Lamyctes* Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 5.

One ocellus on each side. Frontal furrow deep; a median notch visible only in the fore part, not continued into a median furrow. Antennae with 24-46 joints. Coxae of toxicognaths with 2-3 teeth on each side. Posterior angles of tergites rounded or toothed; surface smooth, rarely granulated. Tibia of the legs 1-11 always, 12 generally, 13-14 rarely with tooth-like process distally at the side. Tarsus of legs 1-12, 1-jointed; 13-15, 2-jointed. Claw with two spinules. Coxae of legs 12-15 with one row of pores. Genital appendages of female 3-jointed, generally with 2+2, rarely with 3+3 spurs.

Mandible with four groups of paired teeth, 7-11 sickle-like bristles. A few bifid bristles, and a pad with fine hairs. First maxillae: sternite small, triangular, and fused with the coxae, but the sutures still visible; the coxae connected with their bases. Coxal process with

some strong, simple bristles ; on the lateral side of its base a little group of spinules. A fine line separates a cuneiform piece of the coxa from which the telopodite arises. This line is distinct in *I. castanea*, less clear in the other species. The telopodite is 2-jointed. The basal joint is fused on the inner side with the coxal process. The distal joint bears simple and ramifying bristles. Second maxillae : sternite and coxae fused, forming a coxosternum, the boundaries of the component parts still visible. The sternite is small and rhomboid, the telopodite is 3- or 4-jointed ; the trochanter and femur are separated or fused. Terminal joint with a 4-lobed claw and simple and branched bristles. Tergite and sternite of the praegenital segment of male and female well chitinised, the sternite longitudinally divided in the male. The genital appendages of the male 4-jointed, the last joint long, thin, bristle-shaped, and clothed laterally with small hairs.

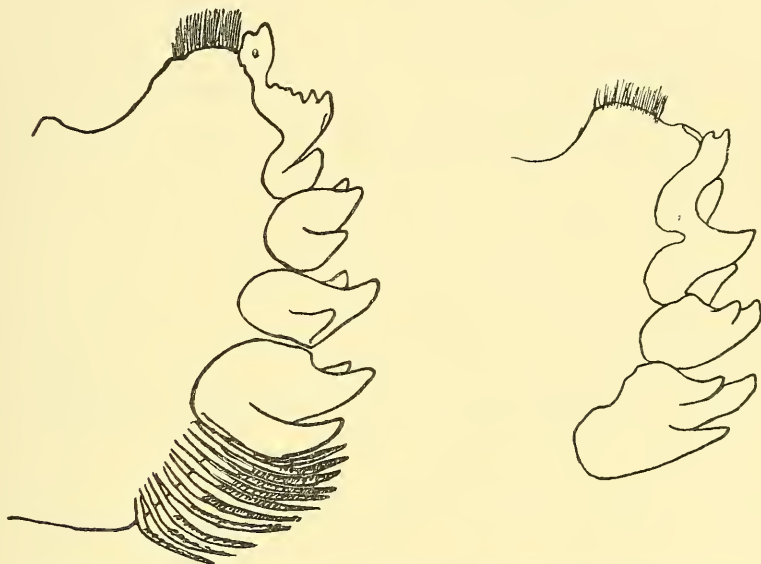
Distribution.—Palearctic Region, Cape Province, Cameroon, East Africa, United States N. America, Chile, Hawaii, Tristan d'Acunha, Juan Fernandez, Java, Australia.

Synopsis of the Species of Lamyctes.

- | | | |
|-----|---|--|
| 1a. | 3+3 genital spurs in the female | <i>albipes</i> Poc. |
| 1b. | 2+2 genital spurs in the female | 2. |
| 2a. | Legs 1-14 with tooth-like process on the tibia; tergites densely granulated | <i>sinuata</i> Por. |
| 2b. | Legs 1-12 or 13 with tooth-like process on the tibia. Tergites smooth | 3. |
| 3a. | Posterior angles of tergites 9-, 11-, 13-toothed | 4. |
| 4a. | 2+2 teeth on the toxicognaths | <i>denticulata</i> Att. |
| 4b. | 3+3 teeth on the toxicognaths | <i>numidica</i> , Latz. |
| 3b. | Posterior angles of all tergites rounded | 5. |
| 5a. | Tibia of legs 12 not toothed. Dorsum dark chestnut | <i>castanea</i> Att., <i>neozelandicus</i> Arch. |
| 5b. | Tibia of legs 12 toothed. Dorsum yellow or reddish-yellow* | 6. |
| 6a. | Tibia of legs 13 toothed; the process of the coxa of the maxillipedes very short, the teeth minute | <i>brevilabiatu</i> s Rib. |
| 6b. | Tibia of legs 13 not toothed. Coxa of maxillipedes with longer process, the teeth larger | 7. |
| 7a. | The majority of the bristles of the legs are very small and slender; between them are longer ones. Coxal pores very small | <i>micropora</i> Att. |
| 7b. | All bristles of the legs long and of equal size. Coxal pores large | 8. |
| 8a. | Toxicognaths with 2+2 teeth. The spinules, especially on the posterior pair of legs, relatively large, nearly half the length of the main claw. Genital spurs of female short and thick | <i>africana</i> Por. |

* Here also the dubious species: *L. chathamensis* Arch., *kermadecensis* Arch., *munianus* Chamb., *oticus* Arch.

and branched bristles (fig. 455). The sternite of the second maxillae is fused with the coxae, forming a coxosternum; the limits of the component parts only just visible. Trochanter and praefemur fused, the telopodite therefore 3-jointed. The claw 4-lobed; two of the lobes smaller than the others. The posterior angles of all tergites rounded. Posterior border of tergites 3, 5, and 8 slightly sinuate, 10, 12, 14, and 15 more strongly sinuate, equal in both sexes. The

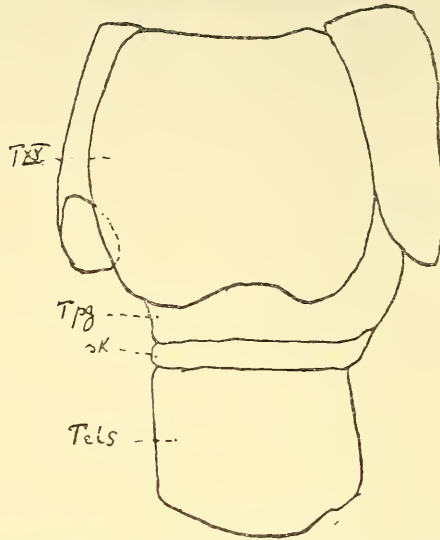


TEXT-FIGS. 11 and 12.—*Lamyctes africana* Por. Right and left mandible of the same specimen.

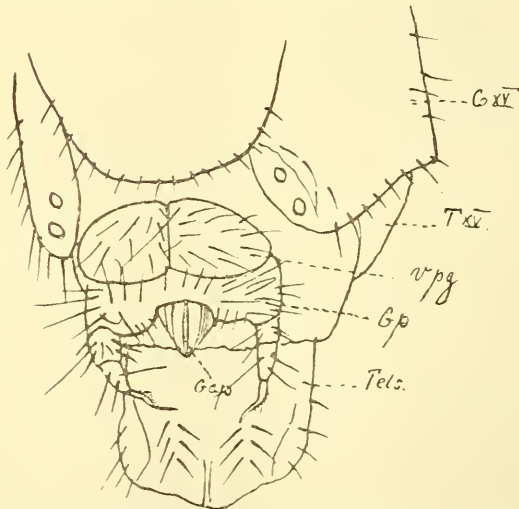
margins and the surface of the tergites clothed with dispersed hairs, as are also the margins of the sternites.

Genital region of ♂ and ♀ (text-figs. 13, 14) with only one well-developed sternite and tergite belonging to the praegenital segment. The genital segment is rudimentary and visible only in the neighbourhood of the genital aperture. The tergite of the praegenital segment (*T.pg*) is connected immediately with tergite 15, while it is connected by a broad, more or less visible intersegmental membrane (*sk*) with the telson. The sternite of the ♂ (*v.pg*) is longitudinally divided. Formerly I took these plates to be basal joints of the gonopods, but I now agree with the view of Verhoeff, who considers them a divided sternite. The genital appendages of the ♂ are inserted on its posterior margin, so that the ventral wall

of the basal joint lies in the continuation of the sternite, while the remaining parts of the basal margin of the first joint pass into the



TEXT-FIG. 13.—*Lamyctes africana* Por. Posterior end of ♂, dorsal view.



TEXT-FIG. 14.—*Lamyctes africana* Por. Posterior end of ♂, ventral view.

soft membrane in the sides. The basal joints are fused with the first part of their internal margins. The appendages are 4-jointed,

and sparsely covered with long hairs. The last joint is very long and thin and bears some minute lateral hairs. Between the two genital appendages is the large conical, laterally compressed process with the genital aperture (*G.ap*).

In the ♀ a large and strongly chitinised tergite of the praegenital segment is present, being contiguous with tergite 15. The ventral side of the genital region of the ♀ is strongly developed. The large pubescent sternite bears the 3-jointed genital appendages, directed backwards and concealing the rudiments of the genital segment with the genital aperture. The basal joint of the appendages bears two conical blunt spurs of equal size; the claw is simple. The tibia of legs 1-12 bears a pointed triangular tooth distally on the outer side, somewhat shorter on the twelfth pair. The claws of all legs have two spinules, one on each side, equal to nearly half the length of the claw. The hairs of the legs may differ in thickness but are of equal length. Number of coxal pores 2, 3, 3, 2.

This species seems to be very abundant over the whole Cape Province and was found in nearly all places where Myriopods were collected. To enumerate all these places would, I think, be useless.

Hitherto known from Cameroon, St. Paul, S.W. Australia, Simonstown, Cape Province, Caffraria, Juan Fernandez.

4. *Lamyctes castanea* Att.

1909. Attems, Schultze's Forsch. Reise, p. 10.

Cape Province.—Cape Flats.

5. *Lamyctes denticulata* Att.

1907. Attems, Deutsche Südpolar Exp., p. 423.

Cape Province.—Signal Hill; Newlands Slope; Tulbagh (3503); Clanwilliam Div. (7576).

Hitherto known from Simonstown, Cape.

6. *Lamyctes micropora* Att.

1909. Attems, Schultze's Forsch. Reise, p. 11.

Cape Province.—Steinkopf, Little Namaqualand.

7. *Lamyctes sinuata* Por.

1893. *Henicops sinuata* Porat, Bih. Sv. Ak. Handl., xviii, p. 5.

1909. *Lamyctes sinuata* Attems, Schultze's Forsch. Reise, p. 9.

Cape Province.—Nieuwoudville, Onder Bokkeveld (2547), Namaqualand Div. (7538).

Hitherto known from Cape Town, Little Namaqualand, Kamaggas, Steinkopf.

B. SPECIES NOT FOUND IN SOUTH AFRICA.

Lamyctes fulvicornis Mein.

1868. *Lamyctes fulvicornis* Meinert, Naturh. Tidsskr., v, p. 266.

1872. *Lamyctes fulvicornis* Meinert, Naturh. Tidsskr., viii, p. 343.

1880. *Henicops fulvicornis* Latzel, Myr. Ost. Hung. Mon., i, p. 133.

Palaeartic Region, United States North America, East Africa (?), Australia (?), New Caledonia.

Whether the East African and Australian specimens really belong to the same species as the Palaeartic should be verified.

Lamyctes albipes (Poc.).

1895. *Henicops albipes* Pocock, Weber's Reise, p. 309.

1907. *Lamyctes albipes* Attens, Javanische Myr., p. 88.
Java.

*Lamyctes brevilabiatu*s Rib.

1923. Ribaut, Nova Caledonia, iii, p. 21.
New Caledonia.

Lamyctes tivius Chamb.

Lamyctes pius Chamb.

Lamyctes pinampus Chamb.

1911. Chamberlin, Ann. Ent. Soc. Amer., p. 33.

1912. Chamberlin, Bull. Mus. Comp. Zool. Harvard Coll., lvii,
pp. 10–15.

Three species from United States North America.

SPECIES TO BE RE-EXAMINED.

Lamyctes inermipes Silv.

1897. Silvestri, Bull. Mus. Zool. Torino, vol. xii, Nr. 283, p. 2.

1899. Silvestri, Contr. Estud. Quilop. Chilen., p. 3.
Argentina.

Lamyctes inermipes var. *pacificus* Silv.

1905. Silvestri, Fauna Chilens., p. 748.
Chile.

Lamyctes fulvicornis var. *hawaiiensis* Silv.

1904. Silvestri, Fauna Hawaiiensis, p. 325.
Hawaii.

Lamyctes emarginatus Newp.

1887. *Henicops emarginata*, Haase, Indo-Austral. Chil., p. 26.
New Zealand.

Henicops? *tristani* Poc.

1893. Pocock, Ann. Mag. Nat. Hist., (6), xi, p. 125.
Tristan d'Acunha.

Lamyctes neozelandicus Arch.

Lamyctes chathamensis Arch.

Lamyctes kermadecensis Arch.

1917. Archey, Trans. N. Zeal. Inst., xlix, p. 309-311.
New Zealand.

Lamyctes oticus Arch.

1921. Archey, Trans. N. Zeal. Inst., liii, p. 181.
New Zealand, Queensland.

Lamyctes tasmanianus Chamb.

Lamyctes zelandicus Chamb.

Lamyctes navaianus Chamb.

Lamyctes munianus Chamb.

1920. Chamberlin, Bull. Mus. Comp. Zool. Harvard, lxiv, pp. 69-71.
Tasmania, New Zealand, Fiji.

Lamyctes cairensis Chamb.

1921. Chamberlin, Ann. Mag. Nat. Hist., (9), vii, p. 53.
Cairo.

Gen. LAMYCTINUS Silv.

1909. Silvestri, Boll. Lab. Zool. Portici, iv, p. 38.

No eyes. About 24 antennal joints. Two or three teeth on each coxa of the toxicognaths. Posterior angles of tergites rounded. Tibia of legs 1-12 with a tooth distally at the outer side. Tarsi 1-12, 1-jointed; 13-15, 2-jointed. No spines on the legs; the bristles strong. Legs 12-15 with 1-3 coxal pores each. Claw of the last pair of legs bearing two spinules. 2+2 genital spurs in the ♀.

Distribution.—Italy, Mexico, Honolulu, Australia.

Type: *Lamycinus caeculus* (Brol.).

1889. *Lithobius caeculus* Brolemann, Ann. Soc. Lin. Lyon, p. 271.

1892. *Henicops caeculus* Berlese, Acari. Myr. Scorp., (22), lxvi, No. 9.

1909. *Lamycinus caeculus* Silvestri, Boll. Lab. Zool. Portici, iv, p. 29.

Milano, Mexico (Jalapa Cuernavaca), Honolulu, Sydney.

Gen. HENICOPS Newp.

1844. Newport, Trans. Linn. Soc. Lond., xix, p. 275.

1901. Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 451.

1909. Attems, Schultze's Forsch. Reise, p. 11.

One ocellus on each side. Number of joints of the antennae 30 or more. Each coxa of the toxicognaths with two or three teeth. Posterior angles of the tergites rounded or toothed. Tibia of legs 1-14 with a distal tooth. Tarsi 1-13, 3-jointed; tarsus 14, 4-6-jointed; tarsus 15, 5-6-jointed. Coxae of legs 12-15 with several pores. Claws with two spinules. ♀, 2+2 genital spurs.

Distribution.—Australia, New Zealand.

Type: *Henicops maculatus* Newp.

1844. Newport, Trans. Linn. Soc., xix, p. 372.

1887. Haase, Indo-Austral. Chil., p. 36.

1891. Pocock, Ann. Mag. Nat. Hist., (6), viii, p. 454.

1901. Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 453.

Tasmania, New Zealand, Australia.

Henicops dentatus Poc.

1901. Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 454.
West Australia.

Henicops oligotarsus Att.

1911. Attems, Fauna S.W. Austral., p. 150.
S.W. Australia.

? *Henicops impressus* Hutton.

1877. Hutton, Ann. Mag. Nat. Hist., (4), xx, p. 114.
New Zealand. Pocock considers this species as synonymous with
H. maculatus Newp.

Synopsis of the Species of Henicops.

- 1a. Tarsus 14, 4-jointed. Tarsus 15, 5-jointed. Tergites 7, 9, 11, 13 toothed
oligotarsus Att.
1b. Tarsi 14 and 15, 6-jointed. Tergites rounded 2.
2a. Spine-like bristles of the tarsi less in number. Posterior margin of tergites
with shallow sinus *maculatus* Newp.
2b. Tarsi with a greater number (5) of spine-like bristles. Sinus of the tergites
deeper *dentatus* Poc.

Gen. HAASIELLA Poc.

1901. Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 449.
One ocellus on each side. 5+5 teeth on the coxae of toxicognaths.
Number of joints of antennae unknown. Posterior angles of tergites
not toothed. Tibia of some of the legs (number unknown) toothed
at the top. Tarsi 1-13 indistinctly 2-jointed; tarsus 14, 2-jointed;
tarsus 15, 1-jointed. Tibia 15 thickened. Coxae of legs 12-15 with
one pore each.
♀ unknown.
This genus contains only one species, *Haasiella insularis* (Haase).
1887. *Henicops insularis* Haase, Indo-Austral. Chil., p. 26.
Auckland.

Gen. PLEOTARSOBIUS Att.

1909. Attems, Schultze's Forsch. Reise, p. 12.
Number of ocelli (?). 2+2 teeth on the coxae of the toxicognaths.
Antennae 19-jointed. Posterior angles of tergites not toothed.

Tarsi 1-12, 1-jointed (tarsi 13 and 14 unknown). In tarsus 15 the second joint is divided into about 15 secondary joints. Claw with two spinules. Coxae of legs 12-15 with one or two pores each.

♀ unknown.

This genus contains only one species, *Pleotarsobius heterotarsus* (Silv.).

1904. *Lamyctes heterotarsus*, Silvestri, Fauna Hawaiiensis, iii, p. 325. Hawaii.

Gen. MARCIANELLA Att.

1909. Attems, Schultze's Forsch. Reise, p. 12.

Three ocelli on each side. Antennae 20-21-jointed. 2+2 teeth on the coxae of the toxicognaths. All tergites rounded. Tarsi 1-13, 1-jointed, tarsi 14 and 15, 2-jointed. Tibiae of legs 1-12 toothed distally. Claw with one spinule. Coxae of legs 12-15 with one or two pores. Legs 14 and 15 of the ♂ strongly thickened.

This genus has one species, *Marcianella triops* (Att.).

1908. *Lamyctes triops*, Attems, Myr. v. Elba. Spengel. Zool. Jahrb., xxvi, p. 186.

Elba.

Gen. WAILAMYCTES Arch.

1917. Archey, Trans. N. Zeal. Inst., xlix, p. 311.

Wailamyctes traillii Arch.

1917. Archey, Trans. N. Zeal. Inst., xlix, p. 312.
Stewart Island, Waiparae.

Wailamyctes halli Arch.

1917. Archey, Trans. N. Zeal. Inst., xlix, p. 313.
Mount Algidas, Rakaia Gorge.

Wailamyctes munroi Arch.

1923. Archey, Rec. Cant. Mus., ii, p. 115.
Auckland Island.

Gen. LAMYCTOPRISTUS nov.

One ocellus on each side. Frontal furrow deep. Antennae with 23 or more joints. 3+3 teeth on the coxae of the toxicognaths. Stigmata on segments 1, 3, 5, 8, 10, 12, 14 (the usual number). Tergites

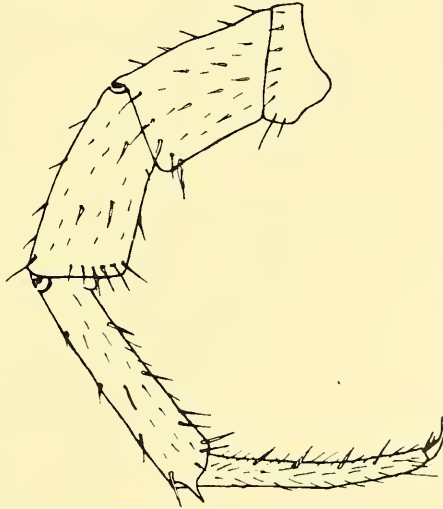
granulated. Tarsi 1-12, 1-jointed, tarsi 13-15, 2-jointed. Tibiae of legs 1-14 distally toothed. No spinule beneath the claw. Coxae 12-15 with a row of pores. Sternite of the praegenital segment of the ♀ deeply sinuate, bilobate. Basal joint of genital appendages pointed on the inner side and furnished with a row of 5-6 teeth.

♂ unknown.

8. *Lamyctopristus validus* n. sp.

(Text-figs. 15, 16.)

Colour chestnut, antennae and legs reddish-yellow. Length 23 mm. Anterior half of the head granulated, smaller than the tergites; posterior half nearly smooth; a border all round, frontal portion separated from the rest by a deep furrow. The median furrow short, not reaching as far as the transverse one. One large ocellus on each side situated on a patch of violet pigment. Antennae 34-jointed, the joints densely covered with hairs; the last joint as long as the two preceding joints. Coxae of toxicognaths with deep median notch, 3+3 small teeth, the surface clothed with scattered hairs. Tergites 1-15 densely and regularly granulated and furnished with minute hairs. The margins bordered; this border is interrupted in the middle of the posterior margin of tergites 9-15. Posterior margin of tergites 1-15 sinuate, becoming more so as they approach the telson. Posterior angles of tergites 9, 11, 13, 14, 15 with broad blunt teeth. Tergite of the praegenital segment short and broad, tergite of genital segment long, narrow, and pubescent. Sternites smooth, with one median furrow and minute scattered hairs. Coxal pores 5, 4, 5, 5 almost round. Tibiae of legs 1-14 (text-fig. 15) having a triangular pointed tooth on the outer side distally. The legs bear numerous slender hairs and two irregular rows of stouter hairs on the under side, disposed in a circle at the end of

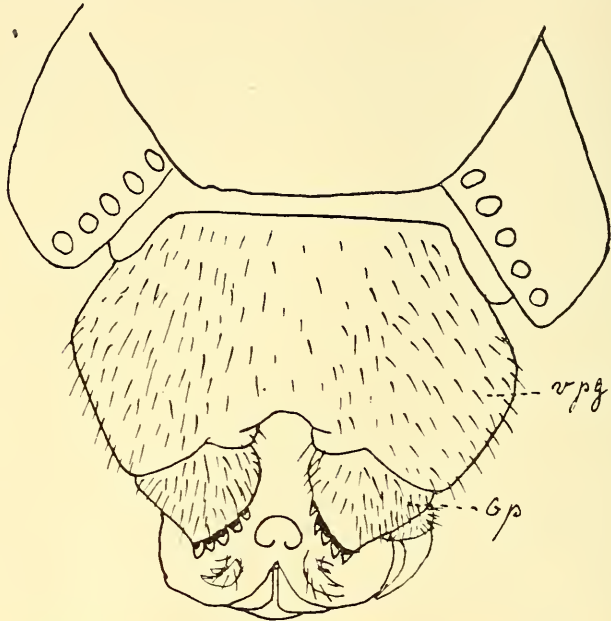


TEXT-FIG. 15.—*Lamyctopristus validus* Att.
Telopodite of first leg of ♀.

of the posterior margin of tergites 9-15. Posterior margin of tergites 1-15 sinuate, becoming more so as they approach the telson. Posterior angles of tergites 9, 11, 13, 14, 15 with broad blunt teeth. Tergite of the praegenital segment short and broad, tergite of genital segment long, narrow, and pubescent. Sternites smooth, with one median furrow and minute scattered hairs. Coxal pores 5, 4, 5, 5 almost round. Tibiae of legs 1-14 (text-fig. 15) having a triangular pointed tooth on the outer side distally. The legs bear numerous slender hairs and two irregular rows of stouter hairs on the under side, disposed in a circle at the end of

joints 1, 3, and 4, and dispersed among the thinner hairs. No spines beneath the claw. Tarsi 1-12, 1-jointed, sometimes traces of a division into two joints. Tarsi 13-15, 2-jointed.

The genital appendages of the ♀ are remarkable: the sternite of the praegenital segment (text-fig. 16, *v.pg*) bears a deep sinus, and on the large rounded lobes arising from this median sinus a broad margin is separated from the neighbouring part by a sulcus. The



TEXT-FIG. 16.—*Lamyetopristus validus* Att. Posterior end of ♀, ventral view.

appendages are 3-jointed. The basal joint has a sharp edge like a hatchet on the inner side, and bears five or six (differing in the two appendages of the same specimen) short, saw-like, dark brown cones. The two distal joints are the same as in *Lamyetes*. Claw simple and pointed.

♂ unknown.

Cape Province.—Gouda, Piquetberg Road Station (7515).

Gen. PARALAMYCTES Poc.

1901. Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 450.

One large ocellus on each side. Antennae 19-20- or 23-43-jointed.

Head-plate rounded, the posterior and lateral margin bordered, the front marked off by a distinct furrow; the median furrow deep. Each coxa of toxicognaths with 2-7 teeth. Posterior angles of tergites rounded or toothed. Stigmata on segments 1, 3, 5, 8, 10, 12, 14. Tarsus of all legs 2-jointed. Tibiae of legs 1-13- or 14-toothed at the top. Coxa of legs 12-15 with a row of pores. Labrum with numerous ramifying bristles on the inside. Mandible with 10 strong sickle-shaped bristles, one row of bifid bristles, four groups of paired teeth, and one furry pad.

First maxillae: sternite small, triangular, partially fused with the coxae. Coxal process with some strong simple bristles. First joint of the telopodite fused on the inner side with the coxa. Last joint with simple and branched bristles. Second maxillae: sternites and coxae fused and forming a coxosternum; telopodites 3-jointed, the limits between trochanter and praefemur being indistinct. Last joint with simple and branched bristles. Claw 4-lobed. The genital segment is not distinctly visible. The praegenital segment with large tergite and sternite, the sternite not divided in the ♂. Genital appendages of the ♂ 4-jointed, the last joint long and thin as in *Lamyctes*. Genital appendages of the ♀ 3-jointed. 2+2 genital spurs. Claw simple.

Distribution.—Cape Province, Chile, Argentine, New Zealand, New Caledonia.

Type: *Paralamyctes spenceri* Poc.

Key to the Species of *Paralamyctes*.

- 1a. Antennae 19-20-jointed 2.
- 2a. Coxa of maxillipedes with 2+2 teeth (New Zealand) . . . *harrisi* Arch.
- 2b. Coxa with 3+3 to 7+7 teeth 3.
- 3a. Posterior margin of the seventh tergite with deep angular notch, the angles toothed. Antennae 19-jointed (Chile) . . . *chilensis* (Gerv.).
- 3b. Posterior margin of seventh tergite straight or with rounded sinus. The angles not toothed. Antennae 20-jointed 4.
- 4a. Each coxa of toxicognaths with 3 or 4 teeth. Tibia of fourteenth pair of legs toothed. Only the thirteenth tergite with distinct teeth in the posterior angles. (Eleventh tergite with indistinct teeth.) Coxal pores oval. Genital spurs of ♀ long, cylindrical. Tergites nearly smooth. Length to 30 mm. (South Africa) *weberi* Silv.
- 4b. Each coxa of toxicognaths with 5 or 6 teeth. Tibia of fourteenth pair of legs not toothed. Tergites 9, 11, 13 distinctly toothed. Coxal pores round. Genital spurs of ♀ short, conical. Tergites rough and creased. Length 15 mm. (South Africa) *spenceri* Poc.
- 1b. Antennae 23- to 43-jointed 5.
- 5a. 2+2 teeth on toxicognaths, antennae 35- to 43-jointed. Posterior angles of the seventh tergite rounded 6.

- 6a. Posterior angles of tergites 7, 9, 11, 13 tooth-like (New Caledonia) *humilis* Rib.
 6b. Posterior border of pedal segments 4, 6, 9, 11, 13, 15 only weakly sinuated (Argentine) *andinus* Silv.
 5b. 6+6 or 7+7 teeth on toxicognaths. Antennae 23- to 35-jointed. Posterior angles of the seventh tergite broad, tooth-like 7.
 7a. Tibiae of legs 14 not toothed (South Africa) *tabulinus* n. sp.
 7b. Tibiae of legs 14 toothed at the ends 8.
 8a. Tergites creased; antennae 27- to 30-jointed. Length 16 mm. (South Africa) *asperulus* Silv.
 8b. Tergites nearly smooth. Antennae 23-jointed. Length 23 mm. (South Africa) *levigatus* n. sp.

9. *Paralamyctes spenceri* Poc.

1901. Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 450.

(Pl. XVIII, figs. 444-450; text-fig. 17.)

Chestnut-brown, legs and distal half of the antennae lighter, frontal area blackish. Length up to 15 mm. Head-plate smooth, bordered on the sides and behind with sparse long hairs. Frontal margin with deep median notch. Antennae short, 20-jointed; the first five or six joints with sparse, the remaining with dense hairs; the last joint as long as the two preceding joints together. Toothed margin of toxicognaths broad, slightly convex, 5+5 or 6+6 very small teeth, the median notch shallow. One ocellus on each side. Nearly all bristles on the inside of the labrum branched (figs. 444, 446). Mandible with four groups of paired teeth; the 10 sickle-shaped bristles very strong; a relatively small number of lateral teeth on the hollowed side facing the teeth. A row of bifid bristles (fig. 448) besides the teeth and sickle-shaped bristles.

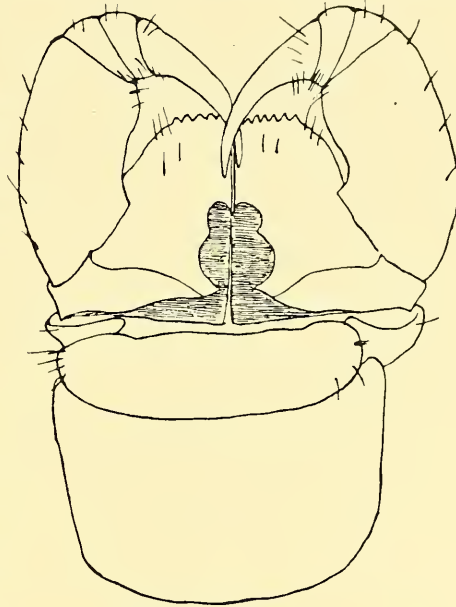
First maxillae (fig. 450): from the ventral side the boundary between the little triangular sternite and the coxae is distinct. From the inside the coxae (*co*) and sternite (*v*) are partially fused. Coxal process (*C.p*) with strong, simple bristles. Telopodite 2-jointed; the first joint (*I*) fused with the coxa on the median side as in *Lamyctes*. Last joint with numerous branched bristles, arranged nearly in two rows on the inside; along the sides and above, simple bristles (fig. 449). Second maxillae: the small sternite is fused with the coxae to form a coxosternum, but the outlines remain visible. Two condyles between coxa and telopodite, one dorsal and one ventral. In the first joint of the telopodite slight traces of the division between trochanter and praefemur. Last joint with simple and branched bristles. Claw 4-lobed (fig. 447).

Tergites with shallow grooves and creases, also sparse hairs, 1-6 and 8 with straight posterior border, 7 deeply sinuate, 9-11 and 13 with broad teeth, 10, 12, 14, 15 slightly sinuate; in the ♂ tergites 14-15 more deeply sinuate. Tergite of praegenital segment of ♂ well chitinised, with some marginal hairs, slightly sinuate behind. The intersegmental membrane between it and the telson long. Sternite of praegenital segment large, undivided (♂, ♀), and pubescent.

Male: genital appendages 4-jointed; the first three joints conical, with scattered hairs, the last joint long, thin, bristle-shaped, with minute lateral hairs. Genital aperture and penis as in *Lamyctes*. The division between genital region and telson distinct.

Female: tergites of the praegenital segment (*Tp*) well chitinised; sternite (*vp*) large, pubescent, the ventral part of the bases of the genital appendages (*Gon*) inserted on the posterior margin; the remainder of the basal margin passes into the folded membrane covering the remaining part of the genital region. From this membrane rises a blunt cone bearing the genital aperture (*G.ap*), the last remnant of the genital segment (fig. 445). Coxal pores small and round, arranged 4, 4, 4, 4 to 5, 5, 6, 5. Tarsi of all legs 2-jointed. Tibiae of legs 1-13 with a triangular tooth distally on the outer side. The two spinules not half as long as the claw. The hairs of the legs scattered and of equal size.

Cape Province.—Signal Hill; Newlands; Table Mt.; Houw Hoek; Caledon; Hogsback, Amatola Mts. *Natal*.—Krantz kop; Durban (Poc.).



TEXT-FIG. 17.—*Paralamyctes spenceri* Poc.
Maxillipedes.

10. *Paralamyctes weberi* Silv.

1903. Silvestri, Redia, i, p. 256.

Chestnut-brown; legs and toxicognaths a lighter colour, yellowish-brown. Length up to 30 mm., breadth 3 mm. Head-plate bordered at the sides and rear. Median furrow deep. Antennae short, 20-jointed, the first four joints with sparse, the remaining joints with short dense hairs. Toxicognaths with 3+3 or 4+4 very small and widely separated teeth. Median notch moderately deep. Tergites smooth and shining, with sparse hairs bordered at the sides; tergites 1, 3, and 5 bordered behind as well. Posterior margin of tergites 1-7 straight, the angles rounded; 8 weakly sinuate, the angles rounded; 9-12 straight. Tergites 9 and 11 with distinct teeth not, or hardly, surpassing the posterior margin, the thirteenth with small teeth surpassing the margin; fourteenth moderately, fifteenth slightly sinuate. Sternites smooth, with scattered long hairs. Coxal pores of legs 12-15 oval; 4-6 on each coxa. Tibiae of legs 1-14 toothed at the end. The numerous hairs of the legs long, thin, and of equal size. Claw with two small spinules. Female with 2+2 long, cylindrical genital spurs.

Cape Province.—Table Mt.; Klastenbosch, Newlands; Kalk Bay; Cape Peninsula (A. 23355); Swellendam; Knysna.

Silvestri described this species from Knysna.

11. *Paralamyctes asperulus* Silv.

1903. Silvestri, Redia, i, p. 256.

Cape Province.—Constantia.

12. *Paralamyctes tabulinus* n. sp.

Colour pale brown. Length 15 mm., width 2 mm. Median furrow of the frontal region deep. Antennae 35-jointed, long. Teeth of toxicognaths 6+6. The tergites are roughened by grooves and creases, the posterior part sparsely granulated as well. All tergites bordered at the sides. Tergites 1-6 straight behind, the corners rounded; 7 and 9 with broad teeth; 11-13 deeply sinuate, but the corners not dentiform; 8, 10, and 12 scarcely, 14 and 15 slightly, sinuate. Coxal pores 5, 6, 6, 5, round. Tibiae of legs 1-13 with pointed tooth. All legs with 2-jointed tarsus. The hairs of the legs moderately dense, of various sizes, long and thick and also short and fine. The two spinules under the claw very small. ♀, 2+2 genital spurs. Claw simple.

Cape Province.—Table Mt.; Newlands Slope; Coldstream, Humansdorp (B. 5298, B. 5304).

13. *Paralamyctes levigatus* n. sp.

Chestnut. Antennae and legs lighter brown, the area surrounding the eyes and the middle of the dorsum blackish. Length 23 mm., width 28 mm. Head-plate round, the sides and posterior finely bordered. Frontal furrow distinct. Median furrow deep. The single ♂ specimen has one 23-jointed antenna (the second is missing). Teeth of toxicognaths 6+6; the toothed margin straight, the median notch deep. The tergites smooth and shining, laterally bordered; tergites 1, 3, and 5 also bordered behind; tergites 7, 9, 11, and 13 with teeth on the posterior angles; these teeth are very broad, but shorter on the seventh tergite; the thirteenth tergite has the most pointed teeth; posterior border of tergites 8, 10, 12, and 15 weakly, of the fourteenth deeply, sinuate. Sternites smooth, with sparse hairs. Coxal pores 4, 5, 5, 5 small, round. Tibiae of legs 1–14 with a pointed tooth. Tarsi of all legs 2-jointed, and densely pubescent on the under side; the hairs of the posterior legs, excepting those of the basal joints, short and spine-like. The spinules very small. The last pair of legs long and slender in the ♂.

♀ unknown.

Cape Province.—Sir Lowry's Pass, Hottentots Holland Mts.; Caledon Div.

Gen. TRIPOROBIOUS Silv.

1917. Silvestri, Indian Lithob. Rec. Ind. Mus. Calcutta, xiii, p. 313.

Triporobius newtoni Silv.

1917. Silvestri, *loc. cit.*, p. 314.

Trichinopoli.

2. Tribe *Zygethobiini* Chamb.

1912. *Zygethobiinae* Chamberlin, Bull. Mus. Comp. Zool. Harvard Coll., lvii, p. 5.

1914. *Zygethobiini*, Attems, Indo-Austral. Myr., p. 92.

No stigmata on the first segment. No ocellus or one on each side.

Distribution.—N. America, Columbia, Japan.

Key to the Genera of Zygethobiini.

- 1a. No eyes. Legs 12-15 with coxal pores *Buethobius* Chamb.
 1b. One ocellus on each side 2.
 2a. Tarsi of all legs 2-jointed. Coxal pores on legs 11-15 *Zygethobius*.
 2b. First tarsal joint of some of the posterior legs divided into 5-11 secondary articulations. Second tarsal joint divided into 2-10 secondary articulations. (Coxal pores ?) *Esastigmatobius* Silv.

Gen. ZYGETHOBIUS Chamb.

1903. Chamberlin, Ent. News, xiv, p. 335.

1912. Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 25.

Chamberlin distinguishes two subgenera, *Zygethobius* and *Zantethobius*.

Zygethobius dolichopus Chamb.

1902. *Henicops dolichopus* Chamberlin, Proc. U.S. Mus., xxiv, p. 797.

1903. *Zygethobius dolichopus* Chamberlin, Ent. News, xiv, p. 335.

1910. *Zygethobius dolichopus* Chamberlin, Pomona Cole. J. Ent., p. 368.

1912. *Zygethobius dolichopus* Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 27.

Utali, Nevada, California.

Zygethobius columbiensis Chamb.

1912. Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 31.

British Columbia.

Zygethobius sokarienus Chamb.

1911. Chamberlin, Canad. Ent., xliii, p. 383.

1912. Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 30.
 California.

Zygethobius (Zantethobius) pontis Chamb.

1911. Chamberlin, Ann. Ent. Soc. Amer., p. 34.

1912. Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 35.
 Virginia, Tennessee.

Gen. BUETHOBIOUS Chamb.

1911. Chamberlin, Ann. Ent. Soc. Amer., p. 34.
1912. Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 18.

Buethobius coniugans Chamb.

1911. Chamberlin, Canad. Ent., p. 383.
1912. Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 22.
California.

Buethobius oobitus Chamb.

1911. Chamberlin, Ann. Ent. Soc. Amer., p. 34.
1912. Chamberlin, Bull. Mus. Harvard Coll., lvii, p. 20.
Mississippi.

Gen. ESASTIGMATOBIUS Silv.

1909. Silvestri, Bull. Lab. Zool. Portici, iv, p. 47.

Esastigmatobius japonicus Silv.

1909. Silvestri, *loc. cit.*, p. 49.
Japan.

2. Subfam. ANOPSABIINAE Verh.

1907. Verhoeff, Bronn's Class. u. Ordn., p. 235.
1911. Attems, Fauna S.W. Austral., iii, p. 235.
1914. Attems, Indo-Austral. Myr., p. 94.

Fourteenth and fifteenth pairs of legs with coxal pores. Antennae 13-17-jointed. Coxa of last pair of legs with long lobate process ending in a little spine. Praefemur of last pair of legs generally, and trochanter sometimes, with strong spines. The basal joint of the telopodite of the first maxillae distinctly demarcated on the median side, not fused with the coxa. No eyes. Stigmata present on segments 3, 5, 8, 10, 12, 14, or 3, 10, 12, or 3, 10. Tarsi of legs 1-12, 1-jointed. Tarsi of legs 13-15, 1- or 2-jointed.

Distribution.—South America (Chile, Patagonia), Australia.

Key to the Genera of Anopsobiinae.

- 1a. Tarsi of all legs 1-jointed. Praefemur of last pair of legs not spined. Stigmata present on segments 3 and 10 *Catanopsobius* Silv.
1b. Tarsi of legs 13-15 or 14 and 15, 2-jointed. Praefemur of last pair of legs with one strong spine. Three or more pairs of stigmata 2.

- 2a. Stigmata present on segments 3, 5, 8, 10, 12, 14. Tarsus 13, 2-jointed
Anopsobius Silv.
 2b. Stigmata present on segments 3, 10, 12. Tarsus 13, 1-jointed . . . 3.
 3a. Tarsus 13, 1-jointed *Dichelobius* Att.
 3b. Tarsus 13, 2-jointed *Tasmanobius* Chamb.

Gen. ANOPSOBIUS Silv.

1899. Silvestri, Contrib. Estud. Chilop. Chilenos., p. 3.

1905. Silvestri, Zool. Jahrb., vi, p. 749.

1907. Verhoeff, Bronn's Class. u. Ordn., p. 235.

1909. Silvestri, Boll. Mus. Lab. Zool. Portici, iv, p. 40.

Distribution.—Patagonia, Chile, New Zealand, South Africa.

Anopsobius patagonicus Silv.

Silvestri, Rendic. R. Acad. Lincei, (5), xviii, p. 320.

1909. Silvestri, Boll. Lab. Zool. Portici, iv, p. 44.

Patagonia.

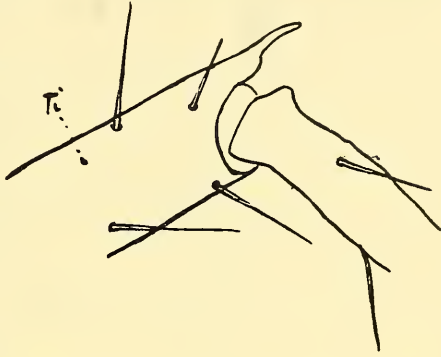
14. *Anopsobius patagonicus calcaratus* n. subsp.

(Pl. XVIII, figs. 451–453 ; Pl. XIX, fig. 454 ; text-figs. 18–22.)

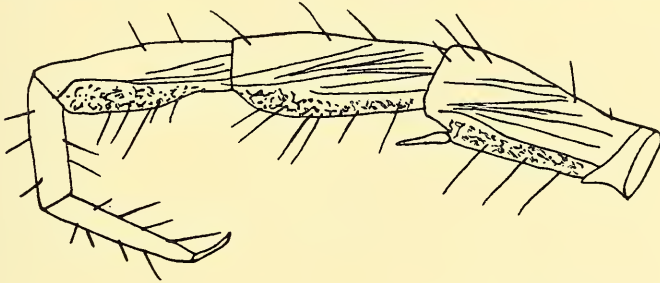
Antennae looking like a string of pearls, 15-jointed, with dispersed hairs, the last joint as long as the two preceding joints together. 5+5 teeth on the toxicognaths. No eyes. Labrum with branched bristles. The sickle-like bristles of the mandibles are short and strong, a little longer than the teeth, and few in number. I noted five, but the animals being badly preserved, this number must be verified. Teeth as in the *Henicopinae*. Coxal process of the first maxillae (fig. 454) furnished with simple bristles. Telopodite 2-jointed, the basal joint distinctly demarcated on the median side. The terminal joint bears some large branched bristles and a few simple, somewhat curved bristles. Second maxillae as in *Henicopinae*, consisting of the coxosternum and the 3-jointed telopodite. The trochanter notch hardly visible. Terminal joint with branched and single bristles. The claw 5-lobed ; the lobes in some cases spiniform, in others broad and flattened. The tergite of the toxicognaths or maxillipedes is freely visible as a broad plate. The tarsus and ungulum of the toxicognaths are fused, forming a tarsungulum as in other *Lithobioidea* (fig. 451). My supposition that the statements of Silvestri concerning the genus *Catanopsobius* are incorrect is again supported by this fact. Posterior angles of all tergites rounded ;

tergite 15 with a shallow sinus behind. Sternites with sparse hairs. Sternite 15 with dense and long hairs.

The ♀ with two coxal pores on the fourteenth and fifteenth legs. ♂ with only one pore on these legs. Tibiae of legs 1-12 with pointed claw-like tooth distally on the outer side (text-fig. 18); the tooth of the twelfth pair is smaller. Tarsi of legs 1-12, 1-jointed; of legs 13-15, 2-jointed. Claw of all legs with one larger anterior and one smaller posterior spinule. The hairs of the legs scattered, some



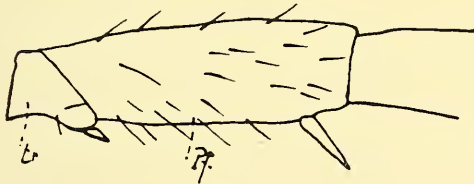
TEXT-FIG. 18.—*Anopsobius patagonicus calcaratus* Att. Tibia of seventh leg of ♂.



TEXT-FIG. 19.—*Anopsobius patagonicus calcaratus* Att. Fourteenth leg of ♂: telopodite.

especially on the under side strong and spine-like. Joints 3, 4, and 5

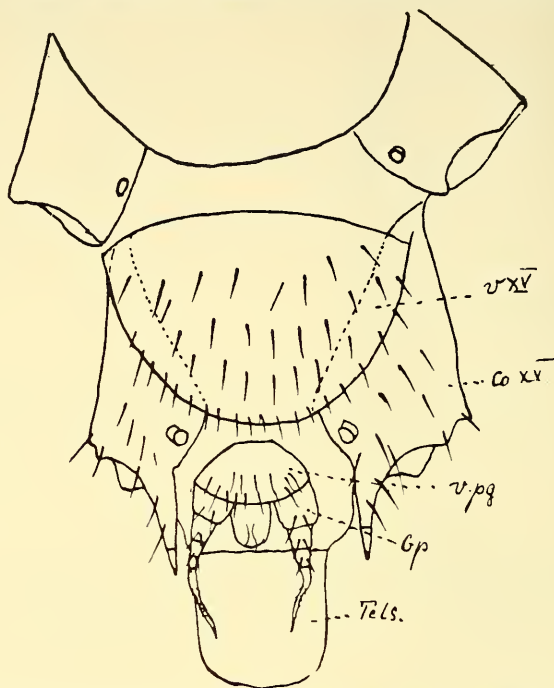
swollen and filled with a glandular mass (text-fig. 19). Coxa of the last pair of legs with a long-pointed and hairy lappet bearing a little spine at the end (fig. 453). Third joint of legs 14 and 15 with one



TEXT-FIG. 20.—*Anopsobius patagonicus calcaratus* Att. Trochanter and praefemur of fifteenth leg of ♂.

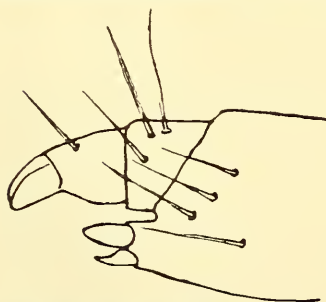
long, light-coloured spine on the under side (text-figs. 19, 20). Second joint of 15 with a similar but smaller spine below. The tergites of

the praegenital segment deeply sinuate behind, slightly pubescent. Sternite of the praegenital segment undivided in both sexes. The



TEXT-FIG. 21.—*Anopsobius patagonicus calcaratus* Att. Posterior end of ♂, ventral view.

genital appendages of the ♂ 4-jointed as in *Lamyctes* (text-fig. 21);



TEXT-FIG. 22.—*Anopsobius patagonicus calcaratus* Att. Gonopod of ♀.

the first three joints with two long bristles each; the last joint long and slender with minute lateral hairs in the middle (fig. 452). Sternite of praegenital segment of ♀ large, the appendages 3-jointed, the basal joint with two stout conical spurs, the median spur being smaller. The claw broad, blunt, and distinctly separated from the preceding joint (text-fig. 22).

Cape Province.—Table Mountain, Platteklip Ravine (7672, 7678, 7680), Newlands Slope (7689, 7699), Camps Bay (7930), Wynberg Hill, Cape Peninsula (1635), Ceres (7524).

Anopsobius neozelandicus Silv.

1909. Silvestri, *loc. cit.*, p. 45.
New Zealand.

Anopsobius productus Silv.

1909. Silvestri, *loc. cit.*, p. 43.
Chile.

Gen. CATANOPSOBIUS Silv.

1909. Silvestri, Boll. Lab. Zool. Portici, iv, p. 46.

Catanopsobius chilensis Silv.

1909. Silvestri, *loc. cit.*, p. 46.
Chile.

Gen. DICHELOBIUS Att.

1911. Attems, Fauna S.W. Austral., iii, p. 151.

Dichelobius flavens Att.

1911. Attems, *loc. cit.*, p. 154.
S.W. Australia.

Dichelobius bicuspis Rib.

1923. Ribaut, Nova Caledonia, iii, p. 24.
New Caledonia.

Fam. LITHOBIIDAE Poc.

1901. Fam. *Lithobiidae*, Pocock, Ann. Mag. Nat. Hist., (7), viii,
p. 488.
1907. Subfam. *Lithobiinae*, tribe *Lithobiini* Verhoeff, Bronn's Class.
u. Ordn., p. 236.
1911. Fam. *Lithobiidae*, Attems, Fauna S.W. Austral., p. 154.
1926. Fam. *Lithobiidae*, Attems, Kükenthal's Handb. d. Zool.,
iv, p. 381.

The pleurites of the toxicognath segment are not connected with one another on the ventral surface, and do not therefore separate the syncoxite of the toxicognaths and the sternite of the first pedal segment. The genital appendages of the ♂ are 1-jointed or 2-jointed styles. Tibiae of all legs without distal tooth-like process. The

sides of the labrum nearest the median tooth are incised, resulting in the formation of two blunt teeth. Anal glands disappear in the adult. Nineteen or more, or very numerous antennal joints. Generally the twelfth to the fifteenth, rarely the eleventh pair of legs with coxal pores. Ocelli generally numerous, rarely wanting. Stigmata on segments 3, 5, 8, 10, 12, 14. All legs with hairs and spines, the latter regularly disposed and of importance for the systematist.

This family is represented in the Palaearctic and Nearctic Regions by very many species. In South Africa only one species of the genus *Lithobius* and one species of *Walesobius* are found. One of them is markedly a Palaearctic species. In tropical India and South America the number of species is small.

Gen. WALESOBIUS.

15. *Walesobius excrescens* n. sp.

Chestnut colour. Length 14 mm. Antennae with 26 joints (♂) or 28 joints (♀). Toxicognaths with 2+2 teeth. Ten ocelli in three irregular rows, situated behind one large single ocellus. Tergites smooth and shining, with shallow grooves bearing a little hair. Tergites 1, 3, 5, 8, 10, 12 are bordered at the sides and behind, tergites 2, 4, 6, 9, 11, 13, 14, 15 only at the sides; on tergite 7 the border is interrupted in the middle of the posterior margin. Tergites 9, 11, 13 with long triangular teeth. Tergites 14 and 15 slightly sinuate behind. Sternites smooth, not furrowed. Legs with sparse hairs. Tarsi 2-jointed, coxae of legs 15 and 14 (♀), or 15, 14, and 13, with one dorsal spine. No lateral spine. Coxal pores round, 4, 5, 5, 3. The lateral edge of the surface bearing the pores not elevated. Spines of last pair of legs $\frac{1, 0, 3, 1, 0}{0, 1, 3, 2, 1}$, claw simple. Legs 15 and 14 of ♂ not furrowed. The fourth joint of legs 15 of the ♂ with a small protuberance situated in a shallow groove at the distal end of the dorsal surface. This protuberance is short, cylindrical, and hollowed out like a crater. In a young ♂ of 10 mm. length this protuberance is scarcely visible. The last legs uniformly chestnut in colour; no joint of a distinctly lighter colour than the rest. ♀, 2+2 genital spurs.

Cape Town, in gardens (7658), Museum grounds (B. 987), Cape.

Gen. LITHOBIUS.

16. *Lithobius peregrinus* Latz.

1880. Latzel, Myr. d. Ost. Ung. Mon., i, p. 63.

Head and dorsum of a uniformly dark chestnut colour; the antennae not darker. Antennae 50-jointed. Fifteen ocelli arranged in four rows. Teeth of toxicognaths 4+4 or 5+5; some of these teeth, *e.g.* the second or third, are sometimes smaller than the rest. Tergites 9, 11, 13 with sharp teeth. Tergites 8, 10, 12, 14, 15 slightly sinuate posteriorly; coxal pores oval, 7, 7, 7, 6.

In ♂ a lateral coxal spine on legs 13, 14, 15, in ♀ on legs 14, 15.

Spines of last pair of legs $\frac{1, 0, 3, 1, 0}{0, 1, 3, 2, 0, 1}$. Claw with one spinule. The tibiae of legs 15 flattened above; no other peculiarities. ♀ with 2+2 genital spurs. The claw 3-lobed.

Cape Peninsula (1514).

I may say here that the South African specimens were compared with the type specimens of Latzel from the Austrian coast, and I could not see any difference between them. It is certainly remarkable that a species should inhabit two places so remote from one another, when the chances of their having been imported by means of ships are practically nil.

2. Sub-suborder CERMATOBIOIDEA Haase.

1855. Fam. *Cermatobiidae* Haase, Zool. Anz., Nr. 210, p. 693.

1887. Fam. *Cermatobiidae* Haase, Indo-Austral. Chil., p. 29.

1901. Fam. *Cermatobiidae* Pocock, Ann. Mag. Nat. Hist., (7), viii, p. 448.

1907. Fam. *Cermatobiidae* Verhoeff, Bronn's Class. u. Ordn., p. 233.

1926. Subsuborder *Cermatobioidea*, Attems, Kükenthal's Handb. d. Zool., iv, p. 387.

First maxillae with an indistinctly 2-jointed lobe on the sternite. Tergites 2, 4, 6, 9, 11, 13 very short, only the lateral teeth visible. No coxal pores. Tarsi of all legs multi-articulate (5-30-jointed). Claw of genital appendages of ♀ curved.

This genus contains a single species, *Cermatobius martensi* Haase, from Adenara, Island of Flores.

2. Suborder CRATEROSTIGMOMORPHINAE Poc.

1902. Order *Craterostigmomorpha* Pocock, Quart. J. Micr. Sci., xliv, p. 444.
 1907. Suborder *Craterostigmomorpha* Verhoeff, Bronn's Class. u. Ordn., p. 232.
 1914. Suborder *Craterostigmomorpha* Attems, Indo-Austral. Myr., p. 91.

This genus contains one species, *Craterostigmus tasmanianus* Poc., from Tasmania.

2. Subclass **Chilopoda Epimorpha** Haase.

1880. Haase, Schlesiens Chilop., i, p. 6.
 1881. Haase, Schlesiens Chilop., ii, p. 66.
 1885. Meinert, Myr. Mus. Cantabr., Trans. Amer. Phil. Soc., p. 177.
 1887. Haase, Indo-Austral. Chil., p. 37.
 1893. Bollmann, Bull. U.S. Mus. No. (46), p. 164.
 1901. Verhoeff, Beitr. z. K. Pal. Myr., xvi; Nova Acta Leop., lxxvii, p. 400.
 1907. Verhoeff, Bronn's Class. u. Ordn., p. 241.
 1914. Attems, Indo-Austral. Myr., p. 100.
 1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 341.

1. ORDER SCOLOPENDROMORPHA Poc.

1895. Pocock, Biol. Centr. Amer., p. 13.
 1902. Pocock, Quart. J. Micr. Sci., xliv, p. 443.
 1903. Kraepelin, Revision der Scolopendriden, Mitt. Naturh. Mus. Hamburg, xx.
 1907. Verhoeff, Bronn's Class. u. Ordn., p. 242.
 1914. Attems, Indo-Austral. Myr., p. 100.
 1921. Grobbelaar, Ann. of the Transvaal Mus., vii, p. 245.
 1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 369.

Of the South African *Scolopendromorpha* the genera *Cryptops* and *Cormocephalus* are the most interesting, because they contain a considerable number of species, some of which are new, while the other genera are represented by only a few species, and, excepting the new species *Colobopleurus fontinalis*, have been known for a long time. The presence of *Asanada brevicornis* in Rhodesia is remarkable, as hitherto this species was recorded only from the Himalayas and the

Andamans. A connecting link to this new area is formed by *Asanada socotrana* from Socotra, thought to be synonymous with *brevicornis*. *Rhysida stuhlmanni* is new to the Cape Province. The great majority of the specimen tubes contained *Arthrorhabdus formosus* and *Scolopendra morsitans*, both apparently very common in South Africa, while the remaining species are represented by only a few specimens.

Key to the South African Genera.

- 1a. No eyes. The last pair of legs of dead specimens is strongly bent or loose like a hinge between tibia and tarsus. The tarsi of most legs 1-jointed. Sternites with one median, or with one median and one transverse furrow
Cryptops Leach.
- 1b. Four ocelli on each side. Last legs of dead specimens straight, not loose at the junction between tibia and tarsus. Tarsi of all legs 2-jointed, sternites with two longitudinal furrows or without furrow 2.
- 2a. Stigmata oval or round, sometimes compressed in antero-posterior direction 3.
- 3a. The three terminal joints of the last legs enlarged and forming a leaf-like structure without claw. Seventh segment without stigma . . . *Alipes*.
- 3b. Terminal legs normal, their last joints not enlarged, with strong claw. Seventh segment with stigma 4.
- 4a. Femur of toxicognaths with strong basal tooth, larger than the tooth-plates of the coxae. Three basal joints of antennae hairless . . . *Rhysida* Wood.
- 4b. Femur of toxicognaths without basal tooth; four basal joints of antennae hairless *Ethmostigmus* Poc.
- 2b. Stigmata parallel to the long axis of the body, triangular, pointed in front 5.
- 5a. Coxopleurae without porose area and without process. Antennae very short, not exceeding the first tergite *Asanada* Mein.
- 5b. Coxopleurae with distinct porose area, generally with well-developed process. Antennae exceeding the first tergite 6.
- 6a. All legs without tarsal spines 7.
- 7a. Process of coxopleurae with numerous spines . . . *Hemicormocephalus*.
- 7b. Process of coxopleura with 0-3 spines 8.
- 8a. Process of coxopleura, if present, very short and not spined, or with one minute spine. The femur of terminal legs not spined, or with minute spinules. The head-plate is not covered by the first tergite
Colobopleurus Kraep.
- 8b. Process of coxopleura with 2 or 3 spines. Spines of femur strong. The head-plate is covered posteriorly by the first tergite . . . *Cormocephalus* Newp.
- 6b. All legs excepting the last with tarsal spines 3.
- 9a. Posterior margin of head-plate entering a furrow of first tergite. Tergite of the second segment with two longitudinal sulci
Trachycormocephalus Kraep.
- 9b. Posterior margin of head-plate free, overlapping the first tergite or simply contiguous 10.
- 10a. No spinules on the claw of terminal legs *Arthrorhabdus* Poc.
- 10b. Spinules of the claw of terminal legs distinct *Scolopendra* L.

1. Fam. CRYPTOPIDAE Kraep.

1903. Subfam. *Cryptopinae*, Kraepelin, Revis. d. Scolop., p. 29.1914. Fam. *Cryptopidae*, Attems, Indo-Austral. Myr., p. 100.1926. Fam. *Cryptopidae*, Attems, Kükenthal's Handb. d. Zool., iv, p. 375.

No eyes. Tarsi 1-19, 1-jointed, with the exception of *Trigonocryptops* (2-jointed). Sternite with transverse furrows or unpaired longitudinal furrow, rarely with two longitudinal furrows.

Gen. CRYPTOPS Leach.

Hitherto not a single species was recorded from South Africa,* and therefore I was astonished to find six species, five new to science, in the material of the Museum. New species are rarer in the *Scolopendromorpha* than in any other group of *Chilopoda*, and now the number of species of this genus is not less than in other countries of the same size. The Palaearctic Region contains 5, Chile 4, South America (Chile excepted) 5; the Indo-Australian Region 8 species. I have adapted the key published by Kraepelin to receive the new species, leaving out the groups containing purely non-South African species.

Synopsis of the Species of Cryptops.

- 1a. First tergite with transverse furrow 2.
- 2a. First tergite with two distinct longitudinal furrows, parallel or converging in the middle from the posterior margin 3. †
- 3a. Longitudinal furrows of the first tergite parallel or slightly convergent through nearly the whole length of the tergite. Transverse furrow arcuate in the middle, not or scarcely prominent posteriorly, without median groove. Anterior margins of coxae of toxicognaths weakly arcuate. Stigmata straight, long, and narrow 4. ‡
- 4a. The two longitudinal furrows of the first tergite converging towards the middle of the transverse furrow. Most of the tergites with distinct low median keel; anterior border of coxae of toxicognaths thickened, without bristles *trisulcatus* Bröl. (Pal.).
- 4b. Longitudinal furrows running parallel to the transverse furrow. Median keel of tergites wanting or indistinct; anterior border of coxae of toxicognaths not thickened, and bearing bristles 5. §

* Porat, 1871, p. 1163, records one mutilated specimen of *Cryptops* from Caffraria.

† Here also *micrus* Chamb., *etophor* Chamb. [Since this paper was written a considerable number of species is published. I can only indicate their approximate place in this synopsis.]

‡ *brunneus* Chamb.

§ *rouxi* Rib.

- 5a. Head-plate with two complete longitudinal furrows. Praefemur of last legs with a longitudinal hairless area 6.
- 6a. Last tergites with median furrow. One spine at end of femur of last leg. Tibia of last leg spined only on the side. Sternite of last segment cut off straight *haasei* Att. (Australia). *
- 6b. Last tergite without median sulcus; femur of last legs not spined below. Tibiae of last legs spined on the outer and inner side. Sternite of last segment rounded (1) *rhodesianus* n. sp. †
- 5b. Longitudinal sulci of the head-plate indistinct; praefemur of last legs without hairless area below 7.
- 7a. Tibiae of last legs spined only on the outside, with 5 saw-like teeth below; first tarsus with 2 saw-like teeth. Anterior margin of toxicognaths with 3+3 bristles *aloyssi-sabaudiae* Silv. (Uganda)
- 7b. Tibiae of last legs spined on the outside and inside, 7-15 saw-like teeth. First tarsus with 3-6 saw-like teeth; front margin of toxicognaths with 5-8 bristles on each coxa 8.
- 8a. Tibiae of last legs with 13-15 saw-like teeth. First tarsus with 6 saw-like teeth. First tergite with two longitudinal sulci, the lateral arcuate furrows beginning on the third tergite *numidicus* Luc. (North Africa).
- 8b. Tibiae of last legs with 7, first tarsus with 3, saw-like teeth; first tergite not sulcate. The lateral arcuate furrows beginning on the fourth tergite *numidicus tropicus* Att. (East Africa).
- 3b. The longitudinal sulci of the first tergite run from the posterior border but mostly converge to the middle, where they cross or terminate in a groove close to the middle of the transverse furrow, which is prominent posteriorly. Front margin of the coxae of toxicognaths almost straight. Stigmata oval or rounded 9.
- 9a. Pores of the coxopleurae numerous (50 or more), reaching the posterior margin of the coxopleurae. Last sternite truncate, the angles not rounded. Praefemur of terminal legs generally with hairless area below, dorsal surface not sulcate. Femur not sulcate, femur and tibia not spined *anomalans* Newp.
- 9b. Coxopleurae with not more than 25 pores, and these situated far from the posterior margin. Angles of the last sternite rounded. Praefemur of last legs generally without hairless area. Praefemur and femur sulcate above, at least distally. Femur and tibia sometimes spined 10. ‡
- 10a. Second tergite not sulcate at all. Transverse furrow of sternites weaker than the longitudinal furrow, sometimes disappearing. Praefemur and femur of last legs with complete longitudinal furrow above. Tergites with green marginal and median bands *crassipes* Silv. (Argentine).
- 10b. Second tergite with two distinct converging longitudinal sulci. Transverse furrow of sternites as deep as the longitudinal furrow. Furrow of praefemur and femur of last legs present at the most in the distal half. Tergites uniform yellow 11.
- 11a. Femur of last legs on the lateral and median side, tibia at least on the median side with strong pointed tooth. Praefemur and femur of last legs sulcate above in the distal half *faei* Poc. (India), *heathii* Chamb. (Brazil).

* *cornifer* Chamb. † *sarasini* Rib. ‡ *relictus* Chamb., *pugnans* Chamb.

- 11b. Femur of last legs without teeth, tibia at most with a little blunt tooth on the lateral side. Praefemur and femur of last legs with very short dorsal sulcus on the top, or not sulcate 12.
- 12a. Praefemur and femur of last legs not sulcate above 13.
- 13a. All tergites without median keel. First tarsus with 2 saw-like teeth, the three basal joints of antennae with long bristles . (2) *peringueyi* n. sp.
- 13b. Tergites from the fourth onwards with a distinct median keel accompanied by shallow grooves. First tarsus with 4 saw-like teeth. Two basal joints of the antennae with long bristles . . . *hyalinus* Sar. (U.S. America).
- 12b. Praefemur and femur of last legs with short sulcus above at the top . . . 14.
- 14a. Pores of coxopleurae more numerous (about 25) and larger. Last legs slender, all legs with long hairs *detectus* Silv. (Chile).
- 14b. Pores of coxopleurae very small and few in number (about 10). Last legs thickened; all legs with short hairs . . . *bayoni* Silv. (Uganda).
- 2b. First tergite smooth, without longitudinal furrows (only with transverse furrow); front margin of coxae of toxicognaths nearly straight, scarcely notched in the middle. Stigmata oval or slit-like
anomalans Newp., *spinifer* Poc., *bivittatus* Poc., *galathea* Mein.,
megalopora Haase, *manni* Chamb., *sulcipes* Chamb., *neocaledonicus*
 Rib. (Not found in South Africa.)
- 1b. First tergite without transverse furrow 15.
- 15a. The head-plate lies over the anterior margin of the first tergite
 (3) *stupendus* n. sp.
- 15b. The first tergite lies over the posterior margin of the head-plate . . . 16.
- 16a. Longitudinal sulci of tergites wanting or present only near the posterior and anterior margin (interrupted in the middle) 17.*
- 17a. Last tergite with complete longitudinal sulcus. Longitudinal furrow of sternites almost disappearing. Coxopleurae arcuate and prominent at the inner angle. Head-plate hairless, scarcely punctuate
modiglianii Silv. (Sumatra).
- 17b. Last tergite not sulcate. Longitudinal furrow of sternites deep. Coxopleurae not prominent on the inner angle. Head-plate weakly pubescent and punctuate 18.
- 18a. First tergite with Y-shaped median sulcus. Last sternite truncate behind or sinuate, the sides converging *monilis* Gerv. (Chile).
- 18b. First tergite without Y-shaped sulcus. Last sternite almost semicircular
 (4) *audax* n. sp.
- 16b. The longitudinal sulci of the tergites, at least from the eighth segment, distinct and complete 19.†
- 19a. Tibia and first tarsus of last legs without saw-like teeth
inermipes Poc. (India).
- 19b. Tibia and first tarsus with strong saw-like teeth 20.
- 20a. Tibia of last legs with numerous saw-like teeth arranged in several rows. First tergite with Y-shaped groove . . . *polyodontus* Att. (Chatham).
- 20b. Tibia with a single row of saw-like teeth. First tergite without Y-shaped groove 21.
- 21a. Femur of last legs with 3 teeth below. Head, tergites, and sternites densely covered with short hairs *triserratus* Att.

* *pictus* Rib.† *mirus* Chamb.

- 21b. Femur of last legs with 1 tooth or none. Head and body sparsely pubescent 22. *
- 22a. The legs before the last pair with dispersed black spinules or bristles
galathea Mein.; *canariensis* Latz.; *niusensis* Chamb.
 (Not South African species.)
- 22b. The legs before the last pair more or less densely covered with fine white hairs 23. †
- 23a. Transverse furrow of sternites as long as the longitudinal furrow; the last third of the coxopleurae not porose *doriae* Poc. (India).
- 23b. Transverse furrow of sternites much longer than the longitudinal furrow; pores nearly reaching the posterior margin of the coxopleurae 24.
- 24a. Stigmata rounded, each coxa with arcuate front margin and 3 fine bristles; praefemur of last legs densely and finely pubescent above, with hairless area below *hortensis* Leach (Pal.).
- 24b. Stigmata oval, front margins of both coxae rectilinear, without bristles; praefemur of last legs with few or no hairs above, below without hairless area, and uniformly pubescent 25.
- 25a. Femur of last legs not toothed below. Tibia with 6, first tarsus with 3, saw-like teeth (5) *philammus* n. sp.
- 25b. Femur of last legs toothed (1 tooth) 26.
- 26a. Tibia of last legs with 8-11, first tarsus with 4-6, saw-like teeth. Longitudinal sulci of the tergites commencing from the fourth segment
 (6) *australis* Newp. (Kraep.), *omissus* Rib.
- 26b. Tibia with 4-9, first tarsus with 2-4, saw-like teeth. Longitudinal sulci of tergites commencing from the fifth or sixth segment
australis var. *kraepelini* Att.‡

17. (1) *Cryptops rhodesianus* n. sp.

Straw-yellow in colour. The same size as *C. hortensis*. Length up to 25 mm. Head-plate with two fine longitudinal sulci running to the anterior margin, finely punctured and pubescent. The head-plate covers the anterior border of the first tergite. Joints 1-3 of the antennae have long bristles; remaining joints with short, velvety hairs and two whorls of longer bristles. Coxae of toxicognaths with distinct median notch and beset with short bristles. First tergite with a transverse furrow and with two parallel longitudinal sulci running from the transverse furrow to the posterior margin. No longitudinal median groove. The median sulci of the second tergite a little convergent, the sulci of the following tergites parallel. No median keel. Outer arcuate furrows present on segments 3-18.

* Here also *dilagus* Arch., *tahitianus* Chamb., *zelandicus* Chamb.

† *lamprethus* Chamb.

‡ Kraepelin, 1908, Fauna S.W. Australia, p. 106, records a *Cryptops australis*. This seems to be a variety of the first-described form, and I have called it variety *kraepelini*.

All tergites finely punctuate and pubescent, the last tergite with rounded, shallow impression but not sulcate. All sternites finely punctured and pubescent; sternites 2-19 with a cross, the longitudinal furrow sharp and shorter than the transverse furrow. Last sternite narrowed posteriorly and rounded, with scattered fine hairs. Stigmata oval.

Legs with scattered fine hairs; praefemur and femur of legs 17-20 densely spined ventrally; the same joints of the remaining legs with only a few spinules. Tarsus of pair 20, 2-jointed, clothed with dense hairs. Porose area of coxopleurae fairly broad, but not extending to the posterior margin; the edge of the non-porose area bearing some spines. Pores very small. Praefemur and femur with a short longitudinal furrow on the dorsal surface, pubescent, densely spined ventrally and laterally, spines intermixed with long hairs; praefemur with narrow naked area. Tibia and tarsus with fine hairs as on the femur, but more numerous. Tibia with a spine on the inside and on the outside, the latter larger, and with eight saw-like teeth below. First tarsus with four saw-like teeth.

Rhodesia (A. 2320).

It is the nearest relative to *C. haasei* Poc., but differs in wanting the median sulcus of the last tergite, in the rounded last sternite, in lacking a tooth at the top of the femur, and in the presence of a tooth on the inside of the tibiae of the last legs.

18. (2) *Cryptops peringueyi* n. sp.

Pale yellow. Length 23 mm.; the body remarkably flat. Head-plate not sulcate; the first three joints of the antennae with long bristles, the remaining joints with dense, velvety hairs and one whorl of longer bristles. Anterior margin of coxae of toxicognaths straight, without distinct median notch and without bristles.

The head-plate covers the anterior margin of the first tergite, which is provided with a transverse furrow; in the middle of this transverse furrow a short median furrow begins, diverging into two longitudinal sulci, also divergent posteriorly. The longitudinal sulci are divergent also on the second tergite. From the third tergite they are parallel and entire. The exterior arcuate furrows are present on segments 3-19. Laterally to the median sulci are dispersed punctures and hairs. No median keel. Last tergite with shallow, broad, not sulcate depression. Sternite with a cross, distinct on the nineteenth segment, indistinct or wanting on the twentieth. Last sternite very much

narrowed behind and rounded. Tarsi of legs 1-20 simple. Legs 1-19 with strong bristles ventrally and fine hairs dorsally. Legs 20 with fine short hairs ventrally, strong bristles laterally, fine hairs dorsally. Porose area with few (about 20) pores; a quarter to a third of the coxopleurae have no pores. Between the pores some dark, strong, short spines. Posterior margin of coxopleurae straight. Praefemur and femur of last legs densely and uniformly covered with dark-coloured spinules ventrally; dorsally with dispersed fine hairs. Femur with one small ventral tooth. Joints not sulcate. Tibia ventrally with thicker, dorsally with finer, long sparse hairs; on the outer side distally one small tooth, six saw-like teeth, first tarsus with two saw-like teeth.

Cape Province.—Table Mt. (7685), Signal Hill (14648), Camps Bay (7729), Hanover (B. 827), Caledon (7372).

19. (3) *Cryptops stupendus* n. sp.

Uniformly straw-yellow without any green bands. Length 26 mm. Head-plate covering the anterior margin of the first tergite, finely punctured. No longitudinal sulci, the basal joints of the antennae with dense and long bristles, the remaining joints with short, velvety hair and one basal whorl of longer bristles. Margin of coxae of toxicognaths straight, without median notch and without long bristles. First tergite not sulcate (transverse furrow also wanting), the median sulci beginning on the fourth segment. On the fourth and fifth segments they are present only in the posterior half, from the sixth tergite they are entire. The exterior arcuate furrows are present in traces on the second tergite, distinct on the eighteenth tergite and onwards. The tergites are finely punctured. Only traces of the median keel. Last tergite not sulcate, but with shallow, broad depression in the posterior half. Sternites 2-19 with a cross, the transverse furrow much longer than the longitudinal furrow. Sternite 20 not sulcate; sternite 21 narrowed posteriorly, rounded, and tongue-shaped with dispersed hairs. Stigmata much elongated, oval.

Tarsi 1-19, 1-jointed; tarsus 20, 2-jointed. Femur and tibia of 20 clothed ventrally with dense, velvety hairs; tarsus with bristles. Legs 1-19 almost hairless. Porose area not extending to the posterior margin; strip not bearing pores fairly broad: the posterior margin of the coxopleurae straight, with some bristles. Joints of last legs not sulcate; praefemur clothed ventrally with dense, short, dark-coloured spinules, without free area in the middle; femur with a few

bristles and one little spine below. Tibia with eight, first tarsus with two, saw-like teeth.

Grotto, Table Mt. (B. 964).

This species is remarkable for the combination of these two characters: (1) first tergite covered in front by the head-plate, and (2) the absence of the transverse furrow. All other species with the first tergite covered by the head-plate have a well-developed transverse furrow on the first tergite ("Halsringfurche").

20. (4) *Cryptops audax* n. sp.

Similar in colour to *C. hortensis*, a uniform reddish-brown or yellow. Length 25 mm. Head-plate not sulcate, but richly punctuate and pubescent. The first two or three joints of the antennae with long bristles, the remainder with dense, short hairs and one basal whorl of longer bristles, the transition being gradual. Anterior margin of coxae of toxicognaths straight, and beset laterally with one or two bristles. First tergite covering posterior margin of head-plate; transverse or Y-shaped furrow wanting. Median sulci beginning on tergites 7-11, and present up to tergites 19 or 20. They are short, and run from the posterior margin; on the posterior segments they are one-third as long as the tergite. Exterior arcuate furrows present on segments 3-19. Last tergite not sulcate. Sternites 2-18 or 19 with a cross, the longitudinal furrow deep and distinct up to the nineteenth sternite, the transverse furrow shallow, arcuate, indistinct on the posterior segments. Sternites strongly punctured and hairy. Last sternite narrowed posteriorly and evenly rounded, nearly semi-circular; the surface with scattered, the margins with denser, hairs. Stigmata small, elongated and oval. Porose area not extending to the posterior margin; non-porose strip small. The pores of medium size. Coxopleurae straight-cut at the top, with dispersed hairs laterally.

Legs hairy, not spined; the pairs before the last densely and uniformly pubescent all round. Last pair not spined and not sulcate above; praefemur with dense and uniformly distributed bristles below; femur without hairless area. All joints in general uniformly and densely covered with bristles, femur provided ventrally with one pointed tooth, tibia with 6-8, first tarsus with three saw-like teeth.

Cape Province.—Table Mt., Newlands Slope (7697), Kalk Bay (150116), Houw Hoek (7353), St. James (150100), St. James (7717),

Simonstown (7722, 7728, B. 1001), River Zonder End (5273), Mossel Bay (1617), Caledon (14651).

21. (5) *Cryptops philammus* n. sp.

Head-plate strongly punctured and hairy, the posterior margin covered by the first tergite. First joint of the antennae with longish bristles: from the second joint dense, short hairs and one basal whorl of longer bristles. Anterior margin of the coxae of the toxico-naths rectilinear without median notch, the whole surface with dispersed bristles. First and second tergites not sulcate; third and fourth tergites with short median sulci near the posterior margin. Tergites 5-19 with complete median sulci. Exterior arcuate furrows present on segments 3 or 4 to 17 or 18. Last tergite not sulcate, with shallow depression. All tergites punctuate. Sternites 2-18 with a cross, the transverse furrow much longer than the deep and distinct but abbreviated longitudinal furrow. Sternite 19 with transverse furrow. Sternites 20 and 21 not sulcate. Sternites thickly punctured. Sternite 21 narrowed and rounded. Stigmata elongated, oval.

Legs sparsely and finely pubescent. Femur of twentieth pair provided ventrally with a felt of dense, short hairs; the remaining joints of this pair not so densely pubescent. Porose area consisting of relatively few pores, the last near to the posterior margin. Last leg dorsally sparsely pubescent and not spined; femur dorsally almost hairless, ventrally not spined. Praefemur and femur ventrally wedge-shaped, blunt, with regularly disposed strong bristles. Tibia with six, first tarsus with three, saw-like teeth.

Cape Province.—Gt. Winterhoek (B. 2246, B. 2271), Kalk Bay (150116), Table Mt. (4096).

22. (6) *Cryptops australis* Newp.

1845. Newport, Trans. Linn. Soc. Lond., xix, p. 408.

1903. Kraepelin, Revis. d. Scolop., p. 58.

1915. Ribaut, Arch. Zool. Expér., lv, p. 336.

1923. Ribaut, Nova Caledonia, iii, p. 35.

Dark brownish-yellow. Length 30 mm. and more, breadth up to 3 mm.; the largest South African species of *Cryptops*. Head-plate not sulcate, punctate, covered by the first tergite. First joint of the antenna with scattered bristles. Second and following joints with dense, short hairs. Anterior margin of coxae of the

toxicognaths rectilinear, without median notch and without long bristles. The whole surface punctured and hairy. Tergites densely and finely punctured. Tergites 1-3 not sulcate, the median sulci and the exterior arcuate furrows complete in the fourth segment. Sternites 2-18 with a cross, only traces of this cross showing on sternite 19. Last sternite narrowed posteriorly and straight cut, clothed with dense hairs. Legs sparsely pubescent. Porose area large, extending almost to the posterior margin; numerous hairs between the pores. Praefemur, femur, and tibia densely pubescent ventrally, not sulcate dorsally; praefemur without hairless area. Femur with 2 (or 1 according to Kraepelin) ventral teeth. Tibia with 10 (8-11 according to Kraepelin), first tarsus with 6 (4-5, Kraepelin), saw-like teeth.

Cape Province.—Hogsback, Amatola Mts. (B 809).

First recorded from New Zealand (Kraep.). Australia, Loyalty Isl., New Hebrides, East Africa.

2. Fam. SCOLOPENDRIDAE.

1898. Fam. *Scolopendridae* Pocock, Biol. Centr. Amer., p. 13.

1903. Subfam. *Scolopendrinae Otostigminae* Kraepelin, Revis. d. Scolop., p. 29.

1907. Superfam. *Scolopendrina* Verhoeff, Bronn's Class. u. Ordn., p. 297.

1914. Fam. *Scolopendridae* Attems, Indo-Austral. Myr., p. 101.

1926. Fam. *Scolopendridae* Attems, Kükenthal's Handb. d. Zool., iv, p. 372.

Eyes present. All tarsi 2-jointed. Sternites with two parallel longitudinal sulci or not sulcate.

1. Subfam. SCOLOPENDRINAE Kraep.

1903. Subfam. *Scolopendrinae* Kraepelin, Revis. d. Scolop., pp. 29, 165.

1907. Fam. *Scolopendridae* Verhoeff, Bronn's Class. u. Ordn., p. 298.

1914. Subfam. *Scolopendrinae* Attems, Indo-Austral. Myr., p. 101.

1926. Tribe *Scolopendrini* Attems, Kükenthal's Handb. d. Zool., iv, p. 373.

Stigmata triangular and at least the anterior angle pointed, parallel to the longitudinal axis of the body, often compressed in a dorso-ventral direction. Tarsal spurs wanting or only one spur.

Gen. SCOLOPENDRA.

23. *Scolopendra morsitans* L.

1903. Kraepelin, Revis. d. Scolop., p. 250.

Cosmopolitan species found in all tropical and subtropical countries. With *Arthrorhabdus formosus* the most frequent Scolopendrid in South Africa. Collected in innumerable localities in all parts of South Africa, from Hereroland to the Transvaal. It would be useless to enumerate all these places.

Scolopendra picturata, *S. intermedia*, *S. cognata*, *S. afzelii*, *S. attenuata*, *S. pilosella*, *S. chlorocephala*, *S. wahlbergi*, *S. saltatoria*, *S. vaga*, *S. calcarata*, *S. impressa* Porat, 1871 and 1876, are synonyms for *S. morsitans*.

24. *Scolopendra subspinipes* Leach.

1903. Kraepelin, Revis. d. Scolop., p. 256.

Syn.: 1871. *Scolopendra elongata* Porat, Öfvers. Vet. Ak. Förh., Nr. 9, p. 1142.

One specimen (No. 7528) is labelled: Port Elizabeth—"in packing-cases from India." There is no doubt that this specimen was imported into South Africa from its true habitat India. Living specimens have been imported into several European ports, e.g. Hamburg.

Porat recorded *S. elongata* from Caffraria.

Gen. ARTHRORHABDUS.

25. *Arthrorhabdus formosus* Poc.

1903. Kraepelin, Revis. d. Scolop., p. 221.

Syn.: 1893. *Arthrorhabdus interveniens* Porat, Bih. Sv. Ak. Handl., xviii, p. 46.

Very common in the south-west districts of South Africa, Great Bushmanland, Namaqualand, Cape Province. Nearly as common as *Scolopendra morsitans*.

Grobbelaar says: "This species is very common in the dry Karroo districts of the Cape Colony. Its distribution beyond the Orange River into the Orange Free State and the Transvaal is very sparse. It is also found in Natal."

An enumeration of all the localities where it was found would have as little value as in the case of *Scolopendra morsitans*.

Gen. TRACHYCORMOCEPHALUS.

Key to the Species of Trachycormocephalus.

- 1a. Last tergite without median sulcus. Only the last tergite bordered laterally. Claw of last legs with spurs. (Antennae 17-jointed, joints 5 and 6 hairless) *after* (Mein.).
- 1b. Last tergite with median sulcus. The tergites are bordered laterally from the seventeenth to the nineteenth segment. Claw of last legs without spurs 2.
- 2a. Antennae short, reaching the posterior margin of the second segment, 19-jointed, 8-11 basal joints hairless. Coxopleurae with 3-5 joints, the posterior margin with 1 spine. Femur of last legs with more than 1 spine; ventro-externally 6-8, ventro-internally 6-8, dorso-internally 5-6 (rarely 3) spines *mirabilis* (Por.).
- 2b. Antennae long, reaching the posterior border of the fifth segment, 17-jointed, 4-5 basal joints hairless. Coxopleurae 2-jointed, no spine on the posterior margin. Femur of last legs less spined; ventro-externally 2-3, ventro-internally 2-3, dorso-internally 3 spines . . . *occidentalis* Att.

Trachycormocephalus mirabilis (Por.).

1903. Kraepelin, Revis. d. Scolop., p. 219.

Kraepelin, having examined both types, states that *Cormocephalus acanthophorus* Kohlrausch (Arch. f. Naturg., 1881, p. 89) (not *acanthopterus*, as Kraepelin writes) is synonymous with *Trachycormocephalus mirabilis* Porat. Porat (1893, Bih. Sv. Ak. Handl., iv, p. 16) identified four specimens from the Cape Peninsula as *Cormocephalus acanthophorus* Kohlr., but we must question the correctness of this determination. The characteristics of all "*Cormocephalus*" and their allies were very vaguely fixed before Kraepelin's revision, and as a relatively large number of true *Cormocephalus* live in South Africa, as we now know, and the area of *Trachycormocephalus mirabilis* extends from East Africa and Zanzibar to Egypt and Mesopotamia, but not further southwards, we can safely presume that Porat had before him some species of *Cormocephalus*, and not *Trachycormocephalus mirabilis*. This latter cannot be considered a member of the South African fauna. Perhaps Porat's specimens are identical with the following species:

26. *Trachycormocephalus occidentalis* Att.

1909. Attems, Schultze's Forsch. Reise, p. 14.

Great Namaqualand, Keetmanshoop, Kubub (Schultze), Kuibis, Farm Voigtsland near Windhoek (Michaelsen).

This species is not represented in the Museum collection.

Three species of *Trachycormocephalus* are described: the two quoted above, and *Trachycormocephalus afer* from Zanzibar and East Africa.

Gen. HEMICORMOCEPHALUS.

27. *Hemicormocephalus multispinus* Kraep.

1903. Kraepelin, Revis. d. Scolop., p. 211.

Krantzkop, Natal (B. 3392), Howick, Natal (A. 32414), Mt. Aylliff (13487), Cape.

Recorded from Durban by Kraepelin.

Gen. CORMOCEPHALUS Newp.

1903. Kraepelin, Revis. d. Scolop., p. 184.

1908. Kraepelin, Fauna S.W. Austral., p. 110.

This genus is one of the most difficult of all *Scolopendridae* to deal with on account of its great uniformity on the one hand, and the great variability of all distinctive characters on the other hand, as stated by Kraepelin. South Africa contains a relatively large number of species, of which six are described here as new.

Key to the South African Species of Cormocephalus.

- 1a. Second and third tergites, and generally also the following tergites to the sixth or seventh, without complete longitudinal median sulci. (Abbreviated sulci sometimes present on these segments) 2.
- 2a. Last tergite with one median sulcus (1) *pontifex* n. sp.
- 2b. Last tergite not sulcate 3.
- 3a. Head-plate with two abbreviated median sulci and distinct basal plates, 5-6 basal joints of the antennae hairless 4.
- 4a. Second and third tergites without median sulci. Sternites roughly punctate *esulcatus* Poc. (Australia).
- 4b. Second and third tergites with short median sulci in front; sternites not punctate 5.
- 5a. The porose area of the coxopleurae does not reach the posterior margin. Claw of last legs with spurs. Spines of praefemur ventro-externally 2-2 or 2-3, ventro-internally and internally 6-10 (2) *esulcatus schultzei* Att.
- 5b. The porose area of the coxopleurae reaches the posterior margin. Last legs without claw-spurs. Praefemur with spines: ventro-externally 1-1 or 1-2, ventro-internally and internally 3-4 (3) *esulcatus capensis* n. subsp.
- 3b. Head-plate without median sulci and without basal plates. 3-4 basal joints of antennae hairless 6.
- 6a. The margination of the tergites begins on the second segment. The marginal furrow outlining the border oblique in front, further from the sides in front than behind, especially on segments 3-6 (4) *punctatus* Por.
- 6b. The margination begins on segments 8-14. The marginal furrow parallel to the sides as usual (5) *pseudopunctatus* Kraep.
- 1b. The complete median sulci begin on the second tergite 7.
- 7a. The porose area of the coxopleurae abbreviated, not or hardly exceeding the posterior end of the sternite; a broad strip of the posterior end of the coxopleurae remaining non-porose 8.

- 8a. First tergite with two fine longitudinal sulci beginning on the posterior margin and passing beyond the middle. The 6 basal joints of the antennae hairless. Coxopleurae with one lateral spine. Claw of last leg with spurs. Spines of praefemur ventro-externally 2-2 to 3-3, ventro-internally 2-3
(7) *oligoporus* Kraep.
- 8b. First tergite without fine sulci in the posterior half, sometimes with very short, deep furrows beginning on the anterior margin 9.
- 9a. Praefemur of last legs long and slender, with 4-5 to 5-5 spines on the ventro-external, and 14 spines on the ventro-internal, aspect. Coxopleurae with one lateral spine. Claw of last legs with spurs (9) *multispinosus* Att.
- 9b. Praefemur of last legs shorter and stouter, with 2-2 to 3-3 spines on the ventro-external, and 2 or 3 spines on the ventro-internal, aspect 10.
- 10a. No spurs on the claw of the last legs. Tarsi of last legs of ♂ densely pubescent (6) *setiger* Por.
- 10b. Claw of last legs with spurs, tarsi not pubescent in either sex
(8) *michaelseni* Att.
- 7b. The porose area of the coxopleurae extending to the posterior margin or nearly so, exceeding the posterior margin of the sternite. The non-porose strip behind, if present, very small 11.
- 11a. The emargination of the tergites begins on segments (2)3-7 12.
- 12a. Praefemur, femur, and tibia of last legs exceptionally thickened, roughly punctate, flattened dorsally (10) *cupipes* Poc.
- 12b. Last legs thickened, but not so strongly, and not or very slightly punctate
(11) *dispar* Por.
- 11b. The emargination begins on segments 10-15 13.
- 13a. Last tergite without median sulcus 14.
- 14a. Last legs with claw-spurs 15.
- 15a. 5-6 basal joints of antennae hairless, praefemur of last legs with more numerous spines on the ventro-external surface than usual. Inner and outer spines meeting in an arcuate line on the base of the praefemur. Body olive-green or brown (12) *calcaratus* Por.
- 15b. 9 basal joints of antennae hairless. Praefemur with 2-2 to 3-3 spines on ventro-external aspect. Body a uniform clay-yellow
(13) *aeruginosus* n. sp.
- 14b. Last legs without claw-spurs 16.
- 16a. 5½, 6, or 7 basal joints of antennae hairless. (14) *nitidus nitidus* Att.
- 16b. 9-14 basal joints hairless (15) *nitidus calvus* n. subsp.
- 13b. Last tergite with one median sulcus 17.
- 17a. Last legs with claw-spurs. (Generally 11-16, rarely 8 or 9, basal joints of antennae hairless. Body olive-green, head and first tergite reddish)
(16) *anceps* Por.
- 17b. Claws of last legs without spurs 18.
- 18a. 9-15 basal joints of antennae hairless (generally uniform yellow but sometimes coloured as in *anceps*) (17) *anceps segnis* n. subsp.
- 18b. 6-7 basal joints of antennae hairless 19.
- 19a. Clay-yellow, the emargination of the tergites beginning on the fifteenth segment (18) *brevicornis* Kraep.
- 19b. Olive-brown to yellow; head, first tergite, and last segments reddish. The emargination of the tergites begins on the seventh to ninth segment
(19) *elegans* Kraep.

28. (1) *Cormocephalus pontifex* n. sp.

Colour uniform clay-yellow. Length to 40 mm. Head-plate with longitudinal sulci and basal plates, not visibly punctate. Antennae 17-jointed, 4-6 basal joints hairless. 4+4 teeth on the coxae of toxicognaths, the three inner teeth of each side more approximate but not fused. First tergite not sulcate. The complete median sulci beginning on the second to fifth segment. (I observed sulci in segments 2, 4, 5 only; the material is not sufficient to ascertain the norm.) Last tergite with one median sulcus. The lateral borders beginning on the tenth to twelfth segment. Sternites 2-20 with median sulci, smooth, not punctate. Legs 1-20 with claw-spurs. Coxopleurae with one lateral spine. The porose area is short, and as far as one can see does not extend beyond the sternite; one large strip on the top of the coxopleurae is non-porose. Process long and slender, 2-pointed. Spines of praefemur of last legs 1·2, 2·1, or 2·2, 2·2, or (??), 4·2. Last legs without claw-spurs.

Vryburg, Bechuanaland (137, 62).

29. (2) *Cormocephalus esulcatus schultzei* Att.

1909. Attems, Schultze's Forsch. Reise, p. 13.

Kubub, Gt. Namaqualand.

30. (3) *Cormocephalus esulcatus capensis* n. subsp.

Head-plate and first tergite densely punctate, the head with fine abbreviated longitudinal sulci and basal plates. Antennae 17-jointed, five basal joints hairless. 4+4 teeth on the coxae of toxicognaths; the three inner teeth of each side fused. First tergite not sulcate. Second and third tergite with short, sharp sulci in front. Fourth to sixth segments with interrupted sulci, seventh and following with complete sulci. The lateral borders begin on the twelfth segment. Last tergite without sulcus. All tergites from the second weakly punctate. Sternites smooth, 2-20 with median sulci; last sternite a little longer than broad, not sulcate. Porose area of coxopleurae broad, much broader than the non-porose part, and extending to the posterior margin far beyond the sternite. Process very short, bearing two points. No lateral spine. Praefemur and femur of last legs thick, rounded. Spines of praefemur very small, 1, 2, 2, 1, or 2, 2, 2, 2; there are also 2-4 small spines on the interior and dorsal surface. Edge spine minute. No claw-spurs.

Cape Province.—Kogmans Kloof, Ashton (1677), Caledon (14653).

31. (4) *Cormocephalus punctatus* Por.

1871. Porat, Öfvers. Vet. Ak. Förh., p. 1160.

1903. Kraepelin, Revis. d. Scolop., p. 194.

The best characters by which to distinguish this species are the marginal furrows limiting the lateral borders. These furrows turn towards the middle in front of each segment, deviating from the lateral margin. In the other species they are parallel to the lateral margin in front of the segment also.

Korokoro, Basutoland (13764); Howick, Natal (A. 23414); Johannesburg, Transvaal (7006).

Kraepelin records it from "The Cape."

32. (5) *Cormocephalus pseudopunctatus* Kraep.

1903. Kraepelin, Revis. d. Scolop., p. 194.

According to Kraepelin the median sulci are complete from the eighth or ninth segment. I observed them to be complete from the sixth or fifth segment. Praefemur of last legs with 3, 3, 3, 3, or 3, 3, 3, 4, or 3, 4, 3, 3 spines, claw-spurs present. Three basal joints of antennae hairless. Tergites bordered from the twelfth.

Transvaal.—Johannesburg (150169). Natal.—Howick (A. 23414); Krantzkoop (B. 3392). Cape Province.—Griqualand, Mt. Ayloff (13487); Port Elizabeth (Kraep.); Enon (A. 2328).

33. (6) *Cormocephalus setiger* Por.

1871. Porat, Öfvers. Vet. Ak. Förh., p. 1158.

1903. Kraepelin, Revis. d. Scolop., p. 204.

Head-plate densely but not roughly punctate. The abbreviated median sulci distinct, basal plates distinct. Antennae 17-jointed, six basal joints hairless. Teeth of toxicognaths 4+4, the coxae punctate in the same manner as the head-plate. First tergite not sulcate, tergites 2-20 with complete median sulci. Last tergite sulcate. Lateral borders beginning from the eighth to sixteenth segment; sternites 2-20 with median sulci. Porose area of coxopleurae narrow, especially behind, and not extending to the posterior margin nor passing beyond the sternite. There is a large border to the coxopleurae behind a porous area, generally no lateral spine, sometimes one spine. Praefemur of last legs hollowed out ventrally, round the groove are 1-2 minute spines. On the ventro-external aspect 2+2, rarely 3+3 spines; ventro-internally 2, internally 2.

The edge spine bifid. The tarsi of last legs of the ♂ densely covered with short hairs. Nearly all specimens examined have pubescent tarsi, but Kraepelin states that the tarsi are not always pubescent. Perhaps the specimens with pubescent tarsi are males, as I stated in the case of *Rhadinoscytalis*.

Cape Province.—Table Mt., Camps Bay (7641); Pacaltsdorp (7529); River Zonder End (B. 5271); Redhouse (B. 977); Mossel Bay (1620). *Natal*.—Merebank, near Durban (150186). *Rhodesia*.—Salisbury (B. 2288). *Transvaal*.—Florida (4055). Port Elizabeth, Cape Town (Kraep.).

34. (7) *Cormocephalus oligoporus* Kraep.

1903. Kraepelin, Revis. d. Scolop., p. 205.

I have only a little to add to the description of Kraepelin. The fine sulci from the posterior margin to the middle of the first tergite are an excellent character, and all my specimens show them distinctly. Kraepelin says that they are generally ("meist") present. The lateral borders begin, according to Kraepelin, on the twelfth or thirteenth segment; in my specimens they begin on these segments or later ones, and continue to the nineteenth. Spines of praefemur 2, 2, 2, 2, or 2, 2, 2, 3, or 3, 3, 2, 2.* Claw-spurs present or wanting.

Vryburg, Cape (13769, 13749). Vlagkop (7774); Goas (B. 1006); Choaberib (B. 1011), S.W. Africa. South Rhodesia (7464). Eierfontein, Cape (A. 23343). Swakopmund (Kraep.); Omaruru, Keetmanshoop, Neudamm near Windhoek (Michaelsen).

35. (8) *Cormocephalus insulanus* Att.

1922. *C. michaelsoni* Attems [non Kraepelin], Mitt. Hamburg. Wiss. Anst. Hamburg. Studienreise, 1911, p. 98.

Colour uniform brownish-yellow. Length to 58 mm., width 4 mm. Head-plate with two fine abbreviated longitudinal sulci; basal plates visible. Antennae 17-jointed. Six basal joints hairless. Maxillipedes with 4+4 teeth. The punctation of the head-plate, dorsum and maxillipedes very shallow. First tergite not sulcate, the complete sulci beginning on the second tergite; the lateral margination beginning on the twelfth to seventeenth segment. Last tergite with median sulcus. Porose area of the coxopleurae relatively short, not extending beyond the last sternite; the broad terminal strip of the coxae non-porose. Coxopleural process bifid, without lateral spine;

* Signifies three spines in two rows on the ventro-external aspect of the left leg, two spines in two rows on the right leg.

sternite of the last legs narrowed posteriorly, the angles rounded. Praefemur of the last legs with two longitudinal rows of 1-3 spines ventro-externally; numbers observed: 2, 3 | 3, 2; 2, 2 | 2, 2; 3, 2 | 2, 2; 3, 2 | 1, 2. (The vertical line separates the numbers for the left and right leg.) On the ventro-internal and internal side 5-6 spines; above, two spines. Superior angular spine bifid. Last legs not especially incrassate and not pubescent. Two claw-spurs present.

Penguin Island, near Lüderitzbucht, S.W. Africa (Michaelsen Coll.).

36. (9) *Cormocephalus multispinosus* Att.

1909. *Cormocephalus oligoporus multispinosus*, Attems, Schultze's Forsch. Reise, p. 14.

Colour uniform clay-yellow. Length to 50 mm. Head-plate with two fine, abbreviated, longitudinal sulci, and finely punctate. Basal plates distinct. Antennae 17-jointed, 10-12 basal joints hairless. Coxae of toxicognaths not punctate, tooth-plates long and narrow, each coxa with 3+1-2 teeth, the inner three teeth equal in size; the outer 1-2 teeth further separated. First tergite not sulcate, or with two very short furrows in front. The complete median sulci begin on the second segment; on this segment they are sometimes interrupted in the middle for a short distance. Last tergite with one median sulcus. The lateral borders begin on the eleventh segment. Sternites smooth, 2-20 with median sulci. Last sternite not long and only a little narrowed behind. The porose area of the coxopleurae is narrow and only exceeds the sternite by a little, not extending to the posterior margin. Process bifid, lateral spine present. Last legs relatively slender. Spines of praefemur on the ventro-external side 5, 5; ventro-internal and internal 15-16; above 4-5. The edge bearing a bifid spine. In the number of spines this species resembles *calcaratus*, and here as there the outer and inner spines meet at the base. All legs, including the last, with claw-spurs.

Cape Province.—Namies, Gr. Bushmanland (7540); Vryburg (13748, 13770); Concordia, Namaqualand (7535); Worcester (7438). *South-west Africa*.—Nonchas to Areb (B. 1015); Namutoni (B. 5311); Otjituo (B. 4115); Grootfontein (B. 4118); Windhoek (B. 4122). First recorded from Kamaggas, Little Namaqualand, Okahandja, Tsumeb, Grootfontein, Kuibis, Windhoek and neighbourhood (Farm Paulinenhof, Farm Voigtsland, Neudamm); Brakwater (Michaelsen), South-west Africa.

37. (10) *Cormocephalus cupipes* Poc.

1891. Pocock, Ann. Mag. Nat. Hist., (6), vii, p. 64.

Length 50 mm.; width 3 mm. Head-plate with abbreviated median sulci and distinct basal plates; eight basal joints of antennae hairless. Tooth-plate of toxicognaths short, broader at the base than long. Teeth 3+3. Tergites 2-20 with complete median sulci. Last tergite with one median sulcus. Lateral borders from the second (Pocock says from the seventh) segment. Last sternite long and narrow, narrowed posteriorly, the median furrow distinct. First stigma short and fairly round. Last legs strongly incrassate throughout. The porose area narrow, but extending to the posterior margin. Process short, bifid, no lateral spine. Praefemur, femur, and tibia above and below densely and roughly punctate, the tarsi more weakly punctate; praefemur, femur, and tibia flattened above. The margins of this flat surface raised into fine edges. Kraepelin thought that Pocock had described a deformity of *Cormocephalus dispar* when describing *C. cupipes*, but the characters drawn from the last legs are constant and very remarkable, and hold good for distinguishing this species. Spines of praefemur ventro-externally 2, 2, ventro-internally 2, internally 2, above 2; edge spine bifid.

Durban, Natal (1597); Masiene, Chai Chai, Portuguese E. Africa (6021).

Pocock records it from the same locality.

38. (11) *Cormocephalus dispar* Por.

1871. Porat, Öfvers. Vet. Ak. Förh., p. 1155.

1901. Kraepelin, Revis. d. Scolop., p. 202.

Syn.: 1871. *Cormocephalus longicornis*, Porat, loc. cit., p. 1159.

Out of ten specimens the lateral margination begins on the third segment in seven, on the second in the eighth, on the fourth in the ninth, and on the fifth in the tenth specimen. 7-13 basal joints of antennae hairless, but generally 9. Process of coxopleurae not spined laterally (Kraepelin states: "with or without lateral spine"). No claw-spurs on the last legs (Kraepelin says: "generally without, rarely with spurs"). Spines of praefemur: ventro-externally 1, 2, ventro-internally and internally 6-7; edge spine simple. Ventral surface of the praefemur hollowed out, the spines being arranged round the groove. Praefemur and femur punctate below. The femur flattened above. Tarsus or both tarsus and tibia of the last legs often clothed with soft white hairs.

Cape Province.—Pacaltsdorp (7392), River Zonder End (B. 4101); Pass at Avontuur, near Storms Vlei (7333), Port St. Johns (A. 23401). *Transvaal*.—(13727–13728), Acornhoek (B. 4087). *Natal*.—(1335). *Rhodesia*.—Umtali. Transvaal, Caffraria, Madagascar (Kraep.).

39. (12) *Cormocephalus calcaratus* Por.

1871. Porat, Öfvers. Vet. Ak. Förh., p. 1159.

1903. Kraepelin, Revis. d. Scolop., p. 209.

I observed five or six hairless basal joints of the antennae (five according to Kraepelin). First tergite with or without two short furrows in front. The outer and inner spines on the praefemur of last legs meet generally at the base of the joint.

Cape Province.—Cape Town (A. 23347), Table Mt., Newlands Slope (2694); above Kirstenbosch (150159, 150161), Kirstenbosch (7632), Brand Vlei, Worcester (1696), Clanwilliam (7574), Kaakadouw Pass (7555), Baavians Kop (13732), Wellington (13499).

40. (13) *Cormocephalus aeruginosus* n. sp.

Colour uniform clay-yellow. Length 55 mm.; breadth 4 mm. Head-plate with abbreviated median sulci and basal plates. Antennae 17-jointed, nine hairless basal joints. Teeth of toxicognaths 4+4, the three inner of each side nearly fused. Tergites 2–20 with complete median sulci. Lateral margination beginning on the tenth to twelfth segments. Last tergite not sulcate. Sternites 2–20 with two complete median sulci; last sternite moderately long. Porose area large, extending to posterior margin of coxopleurae; process bifid, lateral spine present. Spines of praefemur on ventro-external side 2, 2 to 2, 3, ventro-internal 4, 5, dorso-internal 2, 3. Edge spine bifid. Claw-spurs present. Stigmata triangular, elongated.

Tulbagh Road Station (1530), Wellington (13499), Vredenburg (13500), Cape.

41. (14) *Cormocephalus nitidus* Por.

1871. Porat, Öfvers. Vet. Ak. Förh., p. 1159.

1901. Kraepelin, Revis. d. Scolop., p. 210.

Syn.: 1871. *Cormocephalus victorini*, Porat, Öfvers. Vet. Ak. Förh., p. 1156.

Olive-green or yellowish-green; head, antennae, legs, and generally also the first and the last tergite reddish. Length generally up to 80 mm. One giant specimen from East London 105 mm. Head-plate punctate, with abbreviated median sulci and basal plates.

Antennae 17-jointed, 5-7 (generally 5 or $5\frac{1}{2}$) basal joints hairless. Teeth of toxicognaths 4+4. Tergites 2-20 with complete median sulci. Lateral margination beginning on the eighth to fifteenth segment (according to my observation, segments 8-12; according to Kraepelin, 12-15; the discrepancies depend upon whether the observer enumerates the first traces of margination or only complete marginal borders). Last tergite not sulcate. Porose area extending to the posterior margin; process of coxopleurae bifid, lateral spine generally present. Number of spines of the praefemur somewhat variable; externally 1-5 (generally 2), ventro-internally 1-4 (generally 3). The number is often different on the two legs of the same specimen, 2, 3 | 2, 2 or 1, 1 | 2, 2. Legs 1-20 with, 21 without, claw-spurs. Stigmata of segments 3, 5, 7 very large.

This species is very frequent in the Cape Province and Transvaal. Kraepelin records it also from Madagascar.

42. (15) *Cormocephalus nitidus calvus* n. subsp.

Distinguished from the foregoing by having (9)10-14 basal joints of the antennae hairless.

Knysna (1581), Port Elizabeth (1608), Redhouse, Port Elizabeth (A. 2424, B. 971), Cape; Mozambique (1601, 1603).

43. (16) *Cormocephalus anceps* Por.

1871. Porat, Öfvers. Vet. Ak. Förh., p. 1157.

1901. Kraepelin, Revis. d. Scolop., p. 208.

Olive-green. Head-plate and first tergite reddish. Head-plate with abbreviated median sulci and basal plates, generally 11-16 (rarely only 8-10) basal joints of antennae hairless. Each coxa of toxicognaths with 3-4 teeth. Tergites 2-20 with complete median sulci. Lateral margination beginning on the tenth to seventeenth segment. Last tergite with one median sulcus. Porose area extending to the posterior margin. Process of coxopleurae bifid, lateral spine present. Praefemur of last legs with 2, 3 to 3, 5 spines on the ventro-external aspect. All legs, including the last, with claw-spurs.

Very frequent in the Cape Province, from Cape Town to Natal, etc.; Transvaal, Johannesburg (7306); Salisbury (B. 2795), Rhodesia.

44. (17) *Cormocephalus anceps segnis* n. subsp.

Colour generally uniform yellow or brownish, sometimes olive-brown to green. 9-15 basal joints of antennae hairless. Head-plate with

median sulci and basal plates. Teeth of toxicognaths 3+3 or 4+4, the outer teeth more distant. Tergites 2-20 with complete median sulci. Lateral margination beginning on the ninth to sixteenth segment. Last tergite with one median sulcus, first tergite not sulcate. Claw-spurs present on legs 1-19, generally also on leg 20, wanting on the last pair. Spines of praefemur ventro-externally generally 3.3, but also sometimes 2.2 | 2.2, 3.2 | 2.3, 3.2 | 2.2, 3.4 | 4.4, 5.3 | 3.3. Process of coxopleurae bifid, lateral spine present. Porose area large, extending to the posterior margin.

Cape Province.—Modderfontein (150166), Port Elizabeth (7401, 7527, 1515), Redhouse (B. 909), Valley of Desolation, Graaff Reinet (1670, 13469), Knysna (1581), Kogman's Kloof (1678), French Hoek (B. 950), Grahamstown (A. 23387), The Poort, Prince Albert (1582), Nieuwoudtville, Onder Bokkeveld, Calvinia (7546), Eierfontein (A. 23343), Concordia, Namaqualand (7335), Kimberley (B. 4034), Kroonstad (7478), Free State.

45. (18) *Cormocephalus brevicornis* Kraep.

1903. Kraepelin, Revis. d. Scolop., p. 206.

The specimens examined have 4+4 teeth on the toxicognaths. Kraepelin observed two or three on each side.

Salisbury (3406), Rhodesia; Leydsdorp (13516), Transvaal; Baviaans Kop (13724), Cape; Salisbury, Mashonaland (Kraep.).

46. (19) *Cormocephalus elegans* Kraep.

1903. Kraepelin, Revis. d. Scolop., p. 206.

1909. Attems, Schultze's Forsch. Reise, p. 13.

6-8 basal joints of antennae hairless. 3+3 or 4+4 teeth on the toxicognaths, the inner three more or less fused. Spines of praefemur of last legs: 2.1 | 2.0 or 2.2 | 2.2, or 2.3 | 3.2; last legs with claw-spurs. The lateral margination beginning on the eighth or ninth tergite. Last tergite with median sulcus.

Lydenburg (1629), Transvaal; Umzimkulu (A. 23382), Natal; River Zonder End (B. 5283), Cape; Severelela, Kalahari Lookaneng (Schultze).

Kraepelin's specimens were from Lydenburg. Grobbelaar records it from Pretoria and other localities in the Transvaal and Cape Province (Alicedale, Redhouse).

Gen. COLOBOPLEURUS, Kraep.

1903. Kraepelin, Revis. d. Scolop., p. 182.

Kraepelin detaches under this name two South African species from *Cormocephalus*, giving the following key :—

Process of coxopleurae without spines at the end.	Praefemur (=femur Kraep.)
of last legs not or hardly spined	<i>Colobopleurus</i> .
Process of coxopleurae with 2 (rarely 3) spines at the end.	Praefemur of last
legs spined	<i>Cormocephalus</i> .

In 1908 he published a new species (*inopinatus*) from Australia * with a densely spined praefemur, and dropped the second character as a generic one. But even the first-cited character, the presence or lack of terminal spines on the coxopleural process, is modified by the discovery of the new species described further on, as on one side at least one minute spine may be present. Nevertheless, I think that the genus *Colobopleurus* may be retained, being differentiated from the closely allied genus *Cormocephalus* in the following respects :—

Colobopleurus.—The coxopleurae are not or indistinctly protracted on the top, and are generally not spined; rarely one minute spine is present. The head-plate is not overlapped by the first tergite, but the two plates meet freely.

Cormocephalus.—Process of coxopleurae distinct, bearing two or three spines. The head-plate is overlapped by the first tergite.

The characters of *Colobopleurus* are as follows :—

Head-plate with two abbreviated median sulci and small basal plates, not overlapped by the first tergite but meeting it freely. Antennae 17-jointed, 4–10 basal joints hairless. Teeth of toxicognaths 4+4. Praefemur with one large tooth. Tergites 2–20 with complete median sulci, or the sulci abbreviated on the first segments. Last tergite with or without median sulcus. Sternites 2–20 with two complete sulci. No tibial spines. Tibia longer than the tarsus. Coxopleurae of last legs truncate or slightly prominent in the inner angle, generally not spined, rarely one very minute spine. Praefemur spined or not spined. Spine at dorsal edge of praefemur rudimentary or well developed. Claw of last legs with or without spurs. Stigmata short, triangular, nearly circular on the posterior segments.

Distribution.—South Africa, Australia.

* Therefore the statement of Grobbelaar as to the distribution of this genus is erroneous.

Key to the Species of *Colobopleurus*.

- 1a. Praefemur of last legs with numerous minute spines. Last tergite with one weak median sulcus. Claw-spurs of last legs distinct
inopinatus Kraep. (Australia).
- 1b. Praefemur of last legs not spined or at most with 1-3 minute spines. Last tergite not sulcate. No claw-spurs (South Africa) 2.
- 2a. 4-5 basal joints of antennae hairless dorsally; the toothed plate of the toxicognaths scarcely longer than broad *parcespinatus* Por.
- 2b. 6-10 basal joints hairless. The toothed plate of the toxicognaths about twice as long as broad 3.
- 3a. Praefemur of last legs not spined. No spine at the edge. Posterior margin of coxopleurae truncate and straight, without any process . . . *devylderi* Por.
- 3b. Praefemur of last legs generally with one spine on the inside, altogether with 0-3 spines; edge spine always present. The coxopleurae are conical and a little prominent, generally 1-spined *fontinalis* n. sp.

47. *Colobopleurus devylderi* Por.

1893. *Cormocephalus devylderi*, Porat, Bih. Sv. Ak. Handl., xviii, p. 9.

1903. *Colobopleurus devylderi*, Kraepelin, Revis. d. Scolop., p. 183.

Kraepelin noted that 7-19 basal joints of the antennae are hairless, I found only six.

Concordia (7536), Namaqualand.

Kraepelin records it from the same place; Grobbelaar from Namaqualand, Kimberley, Groenkloof, Rustenburg, Gezina, Pretoria.

48. *Colobopleurus parcespinatus* Por.

1893. *Cormocephalus parcespinatus* Porat, Bih. Sv. Ak. Handl., xviii, p. 7.

1903. *Colobopleurus parcespinatus* Kraepelin, Revis. d. Scolop., p. 183.

On the dorsal side five basal joints of the antennae are hairless, on the ventral side the fourth and fifth joints are pubescent and only joints 1-3 hairless. The praefemur of the last legs not spined, the spine at the dorsal edge wanting also. The coxopleurae are protracted and bluntly conical. No claw-spurs. Median sulci complete on tergites 8-20; on tergites 2-7 the sulci are interrupted, the space between the anterior and posterior part of each sulcus diminishing gradually from the second to the seventh tergite. Lateral margination from the fourteenth tergite. Last tergite not sulcate.

Table Mt. (K. 7626); Port Elizabeth (Kraep.).

49. *Colobopleurus fontinalis* n. sp.

Dorsum and terminal joints from the femur to the tarsus olive-green. Head-plate, first tergite, and basal joints of legs reddish. Head-plate with longitudinal sulci, and basal plates densely and weakly punctate. Antennae 17-jointed; 7-9 basal joints hairless. The toothed plate of the toxicognaths nearly twice as long as broad, with four teeth. Basal tooth of the praefemur with small lateral knob. The median sulci are short striae on segments two and three; they are normally interrupted in the middle on segments 4-8, but they are sometimes complete from the fourth and on rare occasions from the second tergite. Lateral margination beginning on the ninth or tenth tergite. Last tergite not sulcate. Sternites 2-20 with two complete sulci. No claw-spurs. Coxopleurae with short, conical prominences bearing generally one minute spine, wanting sometimes on one leg of a pair and present on the other. Porose area large, oval, extending nearly to the posterior margin. Spine on edge of the praefemur well developed; also 0-3 little spines (generally one on the dorso-internal face).

Matjesfontein (13477), Poortjefontein in Hanover (7766), Dunbrody (A. 23359), Burghersdorp (A. 2431), Cape; Smithfield (13776), Orange Free State.

Gen. ASANADA.

50. *Asanada brevicornis* Mein.

1886. *Asanada brevicornis* Meinert, Proc. Amer. Phil. Soc., xxiii, p. 189.

1899. *Asanada socotrana* Pocock, Bull. Liverpool Mus., ii, p. 9.

1903. *Asanada brevicornis* Kraepelin, Revis. d. Scolop., p. 173.

Matopopo district (7468), Matabeleland, Bulawayo (B. 3361), Rhodesia, Mazoe (A. 2322), Salisbury (B. 2291), Rhodesia; Messina (B. 4271), N. Transvaal. Serome, Bechuanaland, Shoholle, Transvaal (Grobelaar).

Himalaya, Andamanen (Mein., Kraep.), Socotra (Poc.), New Guinea (Silv.), Senegambia (Bröl.).

The wide distribution of this rare species is very remarkable.

2. Subfam. OTOSTIGMINAE Kraep.

1903. Subfam. *Otostigminae* Kraepelin, Revis. d. Scolop., pp. 29, 94.

1907. Subfam. *Otostigminae*, *Ethmostigminae*, *Anodontostominae*, Verhoeff, Bronn's Class. u. Ordn., p. 254.

1914. Subfam. *Otostigminae* Attems, Indo-Austral. Myr., p. 102.

1926. Tribe *Otostigmini* Attems, Kükenthal's Handb. d. Zool., iv, p. 374.

Stigmata rounded and compressed in the antero-posterior direction. Tarsal spurs generally present, sometimes two.

Gen. RHYSIDA Wood.

1903. Kraepelin, Revis. d. Scolop., p. 139.

Syn.: *Ptychotrema* Pet., *Branchiostoma* Newp., *Trematoptychus* Pet.

Key to the South African Species.

- 1a. Coxopleurae trifid, the external boundary of the porose area nearly straight. Nineteenth pair of legs with two tarsal spurs, twentieth with one. Stigmata oval or circular *stuhlmanni* Kraep.
- 1b. Coxopleurae bifid. The external boundary of the porose area deeply sinuate. Nineteenth pair of legs with one tarsal spur, twentieth pair with none. First stigma ~-shaped 2.
- 2a. Coxopleurae with lateral spine, the terminal spines strong, praefemur of last legs with 3-4 spines ventrally and on the inside. Mandible with four teeth (Grobelaar) *afra* (Pet.).
- 2b. Coxopleurae not spined laterally; the terminal points minute. Praefemur of last legs not spined or with 1-2 spines. Mandible with five teeth (Grobelaar) *petersi* (Por.).

51. *Rhysida stuhlmanni* Kraep.

1903. Kraepelin, Revis. d. Scolop., p. 152.

Engcobo (13493), Dunbrody (13462), Cape.

Known hitherto from German East Africa and the Zambesi.

52. *Rhysida petersi* Por.

1903. Kraepelin, Revis. d. Scolop., p. 153.

Syn.: 1891. *Trematophychus petersi* Porat, Öfvers. Vet. Ak. Förh., Nr. 9, p. 1166.

Cape Province.—Cape Town (7004), Mossel Bay (7417), Dunbrody (A. 23359, 7382), Port Elizabeth (1519, 7402), Pacaltsdorp (7391), Doornek, Zuurberg Range, Alexandria (7412), Witteklip (7406), Kei Road (B. 830), Amatola, near Hog's Back (B. 938), Port Alfred (B. 2478), Kentani, Transkei (7300), Redhouse (B. 967, 968, 970), Smithfield (A. 23361). *Orange Free State*.—Krugersdorp (A. 23407). *Transvaal*.—Johannesburg (B. 768).

Port Elizabeth (Kraep.). S.W. and Natal, Giant Castle; Haenerts-

burg, Zoutpansberg, District Wakkerstroom, Transvaal. Grahams-town, Cape (Grobbelaar).

53. *Rhysida afra* (Pet.).

1903. Kraepelin, Revis. d. Scolop., p. 153.

No lateral spine on the coxopleurae, but the points at the tip of the coxopleurae and the spines on the praefemur (two on the ventro-external side, two on the ventro-internal) are well developed.

Transvaal.—Johannesburg (7308), 20 miles from Pietersburg, Zoutpansberg (7486), Modderfontein (150167), Florida (B. 4063).

Transvaal, Delagoa Bay, Mozambique (Kraep.); *Transvaal*, Delagoa Bay, Natal, Cape Province, etc. (Grobbelaar). Portuguese E. Africa, Masiene, Chai Chai (6011), Inhambane (5988).

Gen. ETHMOSTIGMUS.

54. *Ethmostigmus trigonopodus* Leach.

1903. Kraepelin, Revis. d. Scolop., p. 158.

Rhodesia.—Salisbury (B. 2224), Bindura (A. 2417), Inziza (A. 2439, A. 2440), Bulawayo (B. 3360), Matoppo (1562), Matabeleland (7466), Umtali (B. 740). *Transvaal*.—Shiliowane, Leydsdorp (15576).

Transvaal (Grobbelaar). Africa from Algeria, Abyssinia, to the Cape Peninsula (Kraep.).

Gen. ALIPES Imh.

1854. *Alipes* Imhoff, Verh. Naturf. Ges. Basel, i, p. 120, t. 1.

1894. *Eucorybas* Gerstaecker, Stettin. Ent. Zeit., xv, p. 309.

1903. *Alipes* Kraepelin, Revis. d. Scolop., p. 133.

Key to the South African Species.

- 1a. Praefemur of last legs bearing a tooth or a cylindrical process at the base. The keels of the tergites rounded, and only in the posterior part of the body with numerous spinules. The spaces between the keels of the anterior and middle segments nearly smooth *calcipes* Ck.
- 1b. Praefemur of the last legs without any process. The keels from the third tergite densely covered with spinules. The spaces between the keels sharply granulated 2.
- 2a. Tibia of last legs posteriorly nearly as wide as long. Posterior margin of the porose area of the coxopleurae rectangular or bluntly angular *crotalus* Gerst.
- 2b. Tibia posteriorly half as wide as long or a little more. Porose area with acute angle *grandidieri* (Luc.).

55. *Alipes calcipes* Ck.

1898. *Alipes calcipes* Cook, Brandtia, xvii, p. 70.

1898. *Alipes spinatus* Cook, *ibid.*, p. 70.

1903. *Alipes calcipes* Kraepelin, Revis. d. Scolop., p. 126.

Rhodesia (A. 24221).

Hitherto recorded from Quango and Angola, S.W. Africa.

56. *Alipes crotalus* (Gerst.).

1854. *Eucorybas crotalus* Gerstaecker, Stettin. Ent. Zeit., xv, p. 312.

1903. *Alipes crotalus* Kraepelin, Revis. d. Scolop., p. 138.

Durban (1507, 1505), Malvern (1506), Natal; Mfongosi, Zululand (B. 4032); Uganda (B. 945). Natal (Kraep.).

57. *Alipes grandidieri* (Luc.).

1864. *Eucorybas grandidieri* Lucas, Ann. Soc. Ent. Fr., iv, (4), p. 420.

1871. *Eucorybas grandidieri* Porat, Ann. Soc. Ent. Fr., v, (5), 1, p. 448.

1871. *Eucorybas grandidieri* Porat, Öfvers. Vet. Ak. Förh., Nr. 9, p. 1162.

1897. *Alipes integer* Cook, Brandtia, xvii, p. 70.

1903. *Alipes grandidieri* Kraepelin, Revis. d. Scolop., p. 138.

Uganda (B. 946).

Caffraria (Porat); Zanzibar, East Africa (Kraepelin).

2. ORDER GEOPHILOMORPHA Poc.

1895. Pocock, Biol. Centr. Amer., p. 35.

1902. Pocock, Quart. J. Micr. Sci., xlv, p. 442.

1903. Attems, Synopsis d. Geoph., Zool. Jahrb., xviii.

1905. Verhoeff, Bronn's Class. u. Ordn.

1909. Brölemann, Arch. Zool. Exp. Gen., (5), iii.

1914. Attems, Indo-Austral. Myr., p. 110.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 342.

As noted above, the Geophilomorpha are divided into ten families; * four of them are represented in the South African fauna, namely, the *Geophilidae*, *Oryidae*, *Mecistocephalidae*, and *Schendylidae*. The descriptions of the three families *Himantariidae*, *Mecistocephalidae*,

* Chamberlin has erected three new families, *Azygethidae*, *Sogonidae*, and *Soniphilidae*, but he has not indicated how they are distinguished from the families hitherto recognised, and it is therefore difficult to include them. The information about the *Azygethidae* is so improbable that I leave out this family.

and *Gombregmatidae* are to be found in my paper cited above on Indo-Australian Myriopoda.

Key to the Families of Geophilomorpha.

- 1a. Mandible with several pectinate lamellae (with or without dentate lamella) 2.
- 2a. Mandible with one dentate lamella besides the pectinate lamellae. Labrum consisting of one piece. Antennae short, thick at the base, gradually tapering; the basal joints with short hairs, without long bristles. Paratergites * generally present. First maxillae with syncoxite . . . *Himantariidae*.
- 2b. Mandible with pectinate lamellae, but without dentate lamella 3.
- 3a. Labrum consisting of one piece, not especially broad. The sides of the cephalic pleura without strong edges. Coxae of first maxilla completely fused, forming a syncoxite; ventral pores present. Paratergites generally present. Antennae tapering, the basal joints (and all the remaining joints) with short hairs only. Toxicognaths small, not or hardly visible from above . . . *Oryidae*.
- 3b. Labrum tripartite; one small median tooth and two broad lateral pieces with strong edges at the sides of the cephalic pleurae. Coxae of first maxillae meeting at the median suture. Ventral pores wanting. Paratergites wanting. Antennae filiform, the basal joints with long bristles arranged in more or less regular whorls. Toxicognaths very large, in great part visible from above *Mecistocephalidae*.
- 1b. Margin of the mandible simply beset with one row of teeth (mandible with or without dentate lamella) 4.
- 4a. Mandible with one dentate lamella. (Labrum consisting of one piece.) Antennae filiform or clubbed *Schendylidae*.
- 4b. Mandible without a dentate lamella 5.
- 5a. Coxae of first maxillae completely separated, bearing a conical second joint. Claws of anterior legs provided with a strong tooth . . . *Neogeophilidae*.
- 5b. Coxae of first maxillae fused, each bearing a medial process and a 1- or 2-jointed telopodite 6.
- 6a. Labrum consisting of one piece. Antennae generally flattened at the base, and tapering 7.
- 7a. Coxae of the last legs much enlarged, extending sometimes to the third segment from behind. Paratergites generally present . . . *Gombregmatidae*.
- 7b. Coxae of the last legs not enlarged, never reaching beyond the last foot-bearing segment anteriorly. Paratergites never present . . . *Sogonidae* (Chamb.).†
- 6b. Labrum in three parts, rarely more or less fused, well developed. The median piece sometimes partially fused with the lateral pieces. Coxae of the last legs not enlarged. Paratergites not present 8.
- 8a. The median piece of the labrum, if present, not fused with the lateral pieces. In the middle the two larger and ventrally directed teeth lacking . . . *Geophilidae*.
- 8b. Median piece of the labrum at least partially fused with the lateral. Two larger teeth in the middle, directed more or less ventrally . . . *Soniphilidae* Chamb.‡

* Paratergites: one or several rows of scutellae between the tergite and the row of pleurites bearing the stigmata.

† See Chamberlin, 1912, Mus. Comp. Zool., liv, p. 430.

‡ See Chamberlin, 1912, Canad. Ent., xliv, p. 65.

The general morphology of the Geophilomorpha has been made fairly clear by many papers in the last few decades, especially by Verhoeff's "Chilipoda" in Bronn's *Classen und Ordnungen*, but I must come back to one point concerning which I do not agree with the views of Verhoeff, *i.e.* the genital region.

In my paper, "Die Myriopoden von Kreta," I have described in detail the posterior part of the body, especially the genital region of *Bothriogaster thesei* (fam. *Himantariidae*). At that time I interpreted the rudiment of the praegenital segment, of which only the sternite is present, as an intercalary segment between the last pedal segment and the only segment in the genital region (as I then thought). Further, I described for the first time the penis of Geophilomorpha.

In the "Synopsis der Geophiliden" I gave a short account of the genital region conforming with the paper of Heymons, "Die Entwicklung von Scolopendra," published in the meantime, and with his interpretation of the genital region as consisting of two segments.

In Schultze's "Forschungsreise in S.W. Afrika," p. 6, I noted that the genital appendages of the Geophilomorpha belonging to the second segment of the genital region (the "genital segment" of Heymons) are not homologous with the genital appendages of the Scolopendromorpha, of which Heymons stated that they belong to the first segment of the genital region, *i.e.* the praegenital segment; and I explained this difference by the fact that the ancestors of both the groups, Scolopendromorpha and Geophilomorpha, possessed genital appendages on both segments, as the Scutigleromorpha still possess them to-day. In the Geophilomorpha the appendages of the first segment, and in Scolopendromorpha those of the second, have disappeared.

In several passages of Bronn's *Classen und Ordnungen* Verhoeff criticises my papers and opposes them, and thus I am again compelled to describe the genital region so that the reader may understand in what the difference between our views consists. But before doing so I must protest once more against the manner in which Verhoeff uses the expressions "genital segment" and "post-genital segment." Heymons first explained, by the development of *Scolopendra*, that the genital region, interpreted hitherto as consisting of one single segment, is really composed of two segments; and he called the first of these segments the praegenital, and the second the genital segment, the latter bearing the genital aperture. Verhoeff, then, by an arbitrary and illogical change, gave to the praegenital segment the name of "genital segment," and to the genital segment (Heymons) the name

of "post-genital segment," but why, heaven alone knows. Apart from the rule of priority, the merest logic demands that we should call the segment with the genital aperture the genital segment and not the post-genital segment. In this paper I use the expression "genital segment" only in the sense given it by Heymons.

A Short Description of the Genital Region.—The genital region is connected with the preceding segment (bearing the last pair of legs) by a soft intersegmental membrane. Dorsally only one tergite is visible; we have no indication as to whether this tergite is the result of the fusion of two tergites, or whether one segment, perhaps the praegenital segment, has completely lost its tergite, or never had a tergite. Ventrally we can see two sternites; the praegenital sternite does not differ much in the two sexes, is more or less oval, pubescent, without appendages; at the sides it passes into the membranous pleurae; behind it is connected by an intersegmental membrane with the genital sternite. The genital segment of both sexes has a large sternite; the ♂ has as well two large pleurae not visible in the female. Behind this the genital segment bears the genital appendages, and in the male the penis. In several families the male pleurae are so large that the base of the sternite is narrowed, and in extreme cases they meet and separate the genital and praegenital sternites completely. Behind the genital sternite there is a declivity bounded by a sharp edge, and this aboral plane bears the genital appendages; in the male the appendages are more slender and cylindrical or conical and further apart; between them the penis is visible; in the female they are flattened, meet in the median line, and are 1- or 2-jointed; therefore the statement of Verhoeff * that the *Epimorpha* never have distinctly articulate appendages in the genital region of both sexes is not correct. For the rest I described the 2-jointed genital appendages in both sexes of *Geophilomorpha* (e.g. Schultze's Forschungsreise in S.W. Afrika, 1909) long before Verhoeff did so in 1918.

In the male the genital segment forms a blunt conical sac, passing without boundary, suture, or fold into the neighbouring wall of the genital segment. This sac contains the penis proper, and can be compared to a praeputium. Dorsally the sac has a longitudinal slit, through which passes the penis. On this point I must correct my description in the "Myriopoden von Kreta." The opening for the penis is not at the tip of the cone, but on its dorsal surface. The shape of the penis is different in different genera, but in all the species examined I found it well chitinised and well coloured, not soft and

* Bronn's Class. u. Ordn., p. 527.

very pale as Verhoeff (p. 532) says. Naturally we must take large-sized specimens to study the penis, and not minute forms. Verhoeff maintains the view that the praegenital and the genital sternites form together the sternite of the one segment called by him "genital segment," while the sac surrounding the penis is the sternite of the second segment called by him "post-genital segment." I cannot agree with this view. The so-called post-genital sternite is nothing else than a sac, inseparable from the part called by Verhoeff "the posterior half of the genital sternite." According to Verhoeff this sac and the posterior half of the genital sternite belong to different segments; in reality they are the indivisible parts of the same segment. On the other hand, the separation between the praegenital sternite and the genital sternite is always very distinct, and sometimes these two sternites are not even in contact, but separated completely by the pleurae of the genital segment, as noted above. I do not understand how anybody can foster the idea that the genital and praegenital sternites are parts of the same sternite, after having examined specimens of the Geophilomorpha.

Fam. ORYIDAE, Cook.*

- 1895. Fam. *Oryidae* Cook, Arrangement of Geoph., Proc. U.S. N. Mus., xviii, pp. 65, 66.
- 1896. Fam. *Oryidae* Cook, Brandtia, vii, p. 33; viii, p. 35.
- 1901. Tribe *Oryini* Verhoeff (Subfam. *Himantariidae*), Beitr. z. K. Pal. Myr., xvi.
- 1903. *Oryinae* Attems, Synopsis Geoph., Zool. Jahrb., xviii, p. 198.
- 1908. Subfam. *Oryinae* (Tribe *Oryinii*) Verhoeff, Bronn's Class. u. Ordn., p. 277.
- 1909. Subfam. *Oryinae*, Brölemann, Arch. Zool. Exp. Gen., (5), iii.
- 1914. Fam. *Oryidae* Attems, Indo-Austral. Myr., p. 115.
- 1926. Fam. *Oryidae* Attems, Kükenthal's Handb. d. Zool., iv, p. 353.

1. Subfam. ORYINAE Bröl.

- 1909. Subfam. *Oryinae*, Tribe *Oryini* Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 309.

Coxae of last legs non-porose. Sternites without peculiar median pore. Labrum consisting of one piece, completely fused in the middle with the margin of the clypeus, shorter or longer remnants of the

* I give here a short synopsis of the whole family.

suture persisting laterally, the free posterior border nearly straight, weakly sinuate or weakly prominent and rounded in the middle, dentate. Mandible with several pectinate lamellae. Hypopharynx strongly developed.

Syncoxite and telopodite of the first maxillae with a pair of tactile lobes each, covered with fine scales. Joints of telopodite free or fused. Coxae of second maxillae forming a syncoxite without lateral prominences. Telopodite 3-jointed, the claw simple or pectinate. Coxae of toxicognaths very broad, no chitinous lines, the anterior margin between the telopodites sinuate. The joints between coxa and tarsungulum very short. Tarsungulum large. The claws strong, but not surpassing the frontal margin. All joints without teeth. The toxicognaths not visible from above. Antennae short, more or less compressed dorso-ventrally, on the basal half with scattered short hairs, the distal half densely pubescent. No long bristles. Head-plate as broad as long or broader than long. The frontal sulcus present or wanting. The basal plate extending to the sides of the body. The tergite of the first foot-bearing segment extending to the internal margin of the scutellum of the second segment.

Tergites with two more or less distinct longitudinal sulci and sometimes with shallow lateral grooves. 0-3 rows of paratergites; scutellum and praescutellum generally separated, rarely fused. Sternites very broad. Ventral pores arranged in two broad transverse bands generally interrupted in the middle, consequently four areas of pores. Sometimes the bands are not interrupted or are even connected laterally, and a closed square of pores results. Last legs 6- or 7-jointed. Coxae small, non-porose. No terminal claw. Sternite of the praegenital segment generally well developed (not visible in the ♀ of *Aspidopleres*). Tergite of genital segment distinct. Male genital appendages 2-jointed, far apart. The penis large, blunt, conical, visible between the appendages. Female appendages meeting in the median line or nearly so, 1- or 2-jointed. Anal segment rudimentary, no distinct tergite, all parts membranous. No anal pores.

The *Oryinae* are a group with relatively few species and are incompletely known (p.e. *Henioria*, *Pentoria*, *Ctenoria*).

One species (*Orphnaeus brevilabiatus*) is widely spread in the tropics, a counterpart to *Mecistocephalus punctifrons* s. lat. The remaining species inhabit South and Central America and Africa; one genus (*Orya*) reaches the Mediterranean region from Africa.

Key to the Genera of *Oryinae*.

- 1a. Last legs 6-jointed 2.
 2a. Paratergites wanting completely. Some of anterior sternites densely pubescent and with two impressions *Diphtherogaster* Att.
 2b. 1-3 rows of paratergites. Sternites without the peculiarities mentioned above 3.
 3a. Claw of second maxillae hollowed out, not pectinate. No frontal sulcus. Tergites with two longitudinal sulci *Notiphilides* Latzel.
 3b. Claw of second maxillae pectinate. Frontal sulcus present. Tergites with four sulci *Pentorya* Ck.
 1b. Last legs 7-jointed 4.
 4a. Scutellum and praescutellum fused. (Claw of second maxillae simple. One row of paratergites) *Orya*, Mein.
 4b. Scutellum and praescutellum separate, at least in the middle and posterior segments 5.
 5a. Claw of second maxillae simple. 161 pairs of legs *Henioria* Ck.
 5b. Claw of second maxillae pectinate or with lateral bristles in the basal half. Number of pairs of legs at the most 111 6.
 6a. One row of paratergites. Mandible with 4-5 pectinate lamellae. Female genital appendages 2-jointed *Orphnaeus* Mein.
 6b. 2-3 rows of paratergites. Mandible with 7-8 pectinate lamellae. Female genital appendages 1-jointed 7.
 7a. Middle and posterior segments with two rows of paratergites. No frontal sulcus *Aspidoperes* Porat.
 7b. Posterior segments with three rows of paratergites; frontal sulcus present *Ctenorya* Ck

Gen. DIPHTHEROGASTER Att.

1909. Attems, Schultze's Forschungsreise S.W. Afrika, p. 16.

58. *Diphtherogaster flavus* Att.

1909. Attems, *loc. cit.*, p. 16.

N.W. Div. of Cape Province (7580), Clanwilliam (7583), Cape.
 Steinkopf, Little Namaqualand (Schultze); Windhoek, Okahandja (Michaelsen), S.W. Africa.

Gen. ORYA Mein.

1870. Meinert, Naturh. Tidsskr., (3), vii, p. 14.

1903. Attems, Synopsis d. Geoph., Zool. Jahrb., xviii, p. 199.

1902. Saussure and Zehntner, Grandidier, Madagascar, p. 339.

Orya barbarica Gerv.

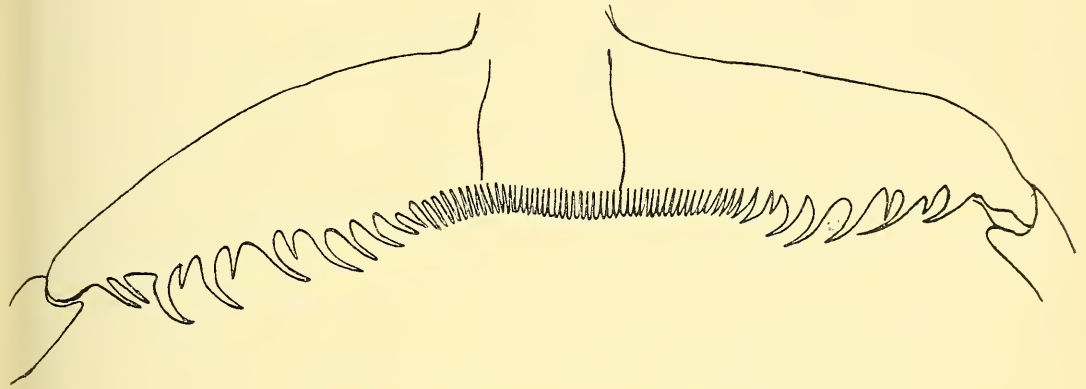
1835. *Geophilus barbaricus* Gervais, Mag. Zool. d. Guerin, ix, pl. cxxxiii, fig. 3.

1870. *Orya barbarica* Meinert, Naturh. Tidsskr., (3), vii, p. 16.

1803. *Himantarium fusatum* Koch, Die Myr., ii, pp. 90, 195, fig. 212; p. 106, fig. 213.

(Pl. XIX, figs. 465, 466; text-figs. 23-29.)

Colour brownish-yellow. Very large; up to 22 cm. (Meinert says 115-120 mm.). 97-125 pairs of legs. Head-plate with fine punctations, nearly as broad as long; frontal sulcus distinct. The first three antennal joints with scattered hairs, nearly hairless; the pubescence increases quickly and the seventh or eighth joint is densely pubescent. All hairs short. No long bristles. Antennae short, extending to the posterior margin of the first foot-bearing



TEXT-FIG. 23.—*Orya barbarica* Gerv. Labrum.

segment; awl-shaped. Clypeus regularly tessellate and pubescent. The hairs minute; the central part raised and fused with the labrum, the suture between labrum and clypeus disappearing in the middle and preserved at the sides. The labrum consists of one piece, but near the middle two fine parallel lines are visible. Meinert calls the labrum "bipartite"; but that is incorrect, as are also his drawings. The free border bears little close-set teeth in the centre, and longer, sharp, curved teeth at the sides (text-fig. 23). The shaft and the trunk of the mandible are distinctly separate. Meinert mentioned 7-8 pectinate lamellae; I observed only five (Tunis). The lamellae are arranged on the sides. The teeth are short (text-fig. 24). The coxal processes of the syncoxites of the first maxillae (fig. 466) are bounded by a fold, and bear few bristles. The syncoxite has on each side a pointed lobe covered with scales like those on a pineapple. Telopodite indistinctly 2-jointed, the basal joint with a broad,

rounded lobe turned to the dorsal side, the distal joint densely pubescent. The second maxillae (fig. 465) consist of the syncoxite and the 3-jointed telopodites, which are covered with short bristles. Terminal claw simple, spoon-shaped.

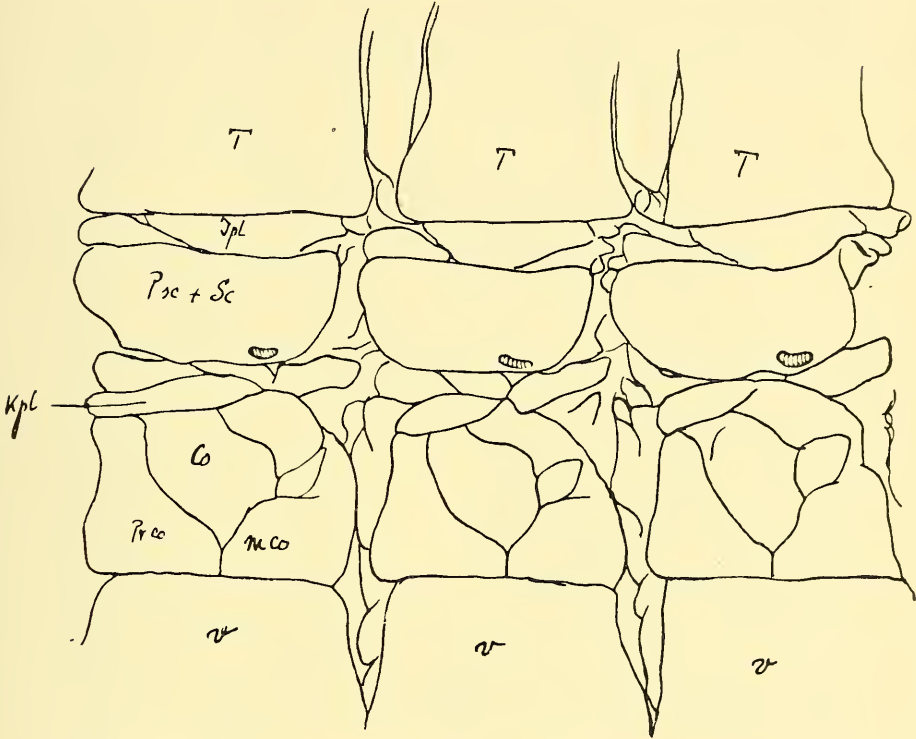
Main tergites from the third with two longitudinal sulci and a shallow groove on the side of the sulci, slightly wrinkled, the last



TEXT-FIG. 24.—*Orya barbarica* Gerv. Mandibles.

tergites becoming more finely granular towards the posterior end. The main tergites meet laterally and are sand-glass shaped in a transverse direction; the little intercalary tergites are therefore pointed at the sides; on the first segments they are nearly invisible. The sternites are twice as broad as long, smooth, with two shallow transverse impressions. The little pores are arranged in a close square, intermixed with minute hairs confined to a bare non-reticulated spot. On the posterior border of the sternite each hair is inserted in a little groove.

Praescutellum (*Psc*) and scutellum (*Sc*) are fused (text-fig. 25). One row of two paratergites (*Ipl*). The coxa is surrounded by several sclerites, two ventral (procoxa and metacoxa, Verh.) and three dorsal (katopleurae, Verh.). These sclerites are not all sharply separated, but are parts of the folded and flexible pleural membrane,



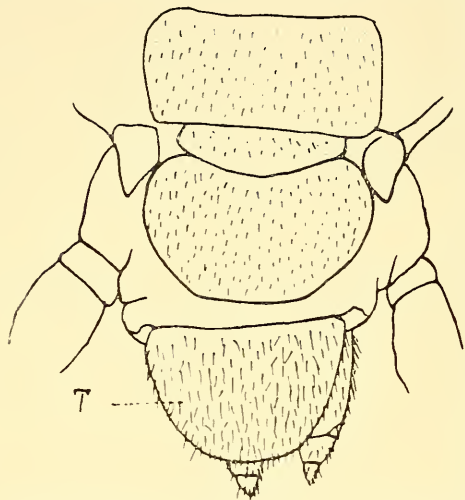
TEXT-FIG. 25.—*Orya barbarica* Gerv. Sclerites of three segments dissected.

forming smaller and inconstant sclerites between the main sclerites mentioned above. The intercalary sternites are narrow and medially pointed. When the animal is contracted they are invisible on the anterior and middle segments. The ventral pleurites have the same pores as the sternites, but in smaller numbers. They bear besides dispersed minute hairs, like the tergites (main and intercalary tergites). The tergite of the last foot-bearing segment is large, kidney-shaped, connected with the genital tergite by an intersegmental membrane. This membrane passes directly into the pleurae of the genital segment, and these pleurae pass dorsally without suture into the coxae of the

last legs, a true coxopleura being developed. The intersegmental membrane is hairless in contradistinction to the tergites. The sternite of the last foot-bearing segment is rounded behind in the ♂, and at the sides and behind the coxa a large part of the intersegmental membrane is exposed. In the ♀ the sternite is very short and broad, and rectilinear or sinuate behind. The intercalary sternites of the last foot-bearing segment meet under the margin of the preceding sternite. The last legs are 7-jointed; the coxa is non-porose, with no terminal

claw. The legs of the ♂ are but slightly incrassate and covered with dispersed hairs.

The genital region has one large tergite, densely pubescent, rounded behind (text-fig. 26). The sternite of the praegenital segment is short and broad, pubescent in both sexes. The sternite of the genital segment of the ♂ (text-fig. 27) is almost separated from the sternite of the praegenital segment by the large pubescent pleurae nearly meeting in the middle

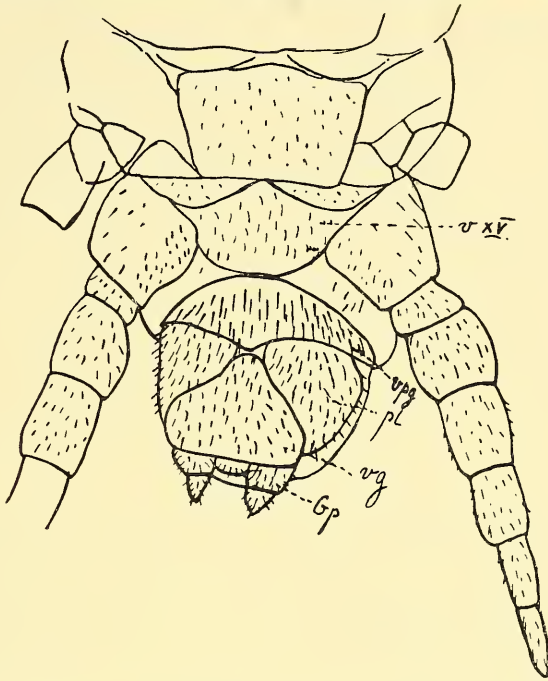


TEXT-FIG. 26.—*Orya barbarica* Gerv. Posterior end of ♂, dorsal view.

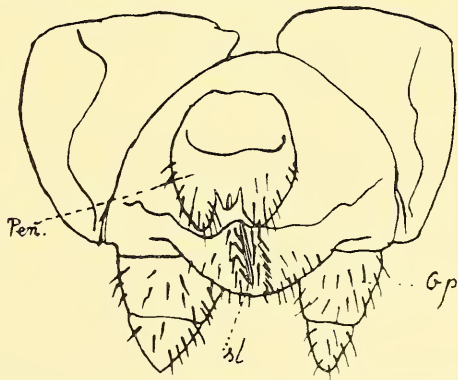
line. The genital sternite is triangular, the angles blunt. The posterior border is declivous, and bears the 2-jointed genital appendages between the gonopods; the sac of the penis is visible as a blunt pubescent cone with a dorsal longitudinal slit beset with strong bristles. The penis (text-fig. 28, *Pen*) rises out of this slit, and bears two little pubescent cones, one on each side of the genital aperture.

In the ♀ the sternite of the genital segment is very large and reaches to the sides of the body, on account of which the pleurae are not visible. The posterior margin is rectilinear and bears the 2-jointed genital appendages meeting in the middle line. The second joint is very small (text-fig. 29). The anal segment is rudimentary, especially in the ♂, and soft and membranous in all its parts. We cannot discern a tergite. The ventral side in the ♀ is somewhat more strongly chitinised.

This species had been recorded previously from Tunis, Algiers, Morocco, and the south of Spain; later from the Mediterranean region.



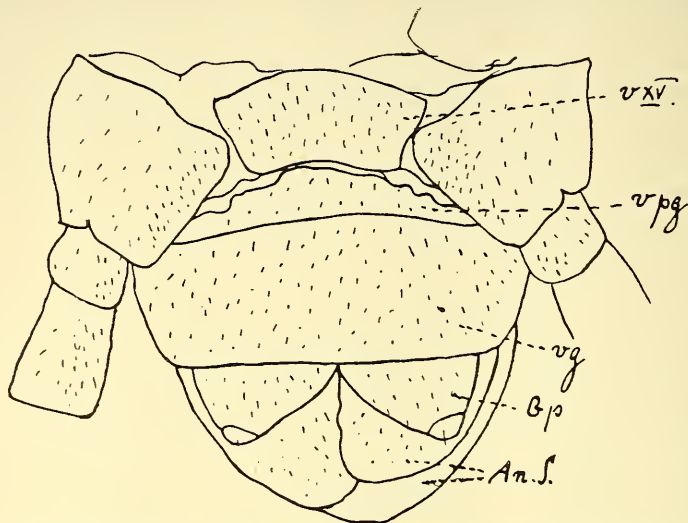
TEXT-FIG. 27.—*Orya barbarica* Gerv. Posterior end of ♂, ventral view.



TEXT-FIG. 28.—*Orya barbarica* Gerv. Gonopods and penis of ♂.

The collection of the Museum contains one single specimen from Mogador, Morocco (B. 960) with 97 pairs of legs.

In Tunis I found this species abundantly in many places, generally



TEXT-FIG. 29.—*Orya barbarica* Gerv. Posterior end of ♀, ventral view.

with 111 pairs of legs. Meinert stated 109–125 pairs; Lucas, 118–122 pairs; Koch, 97–123 pairs.

Gen. ASPIDOPLERES Por.

1893. Porat, Bih. Sv. Ak. Handl., xviii.

1894. Porat, *ibid.*, xx, p. 18.

59. *Aspidopleres intercalatus* Por.

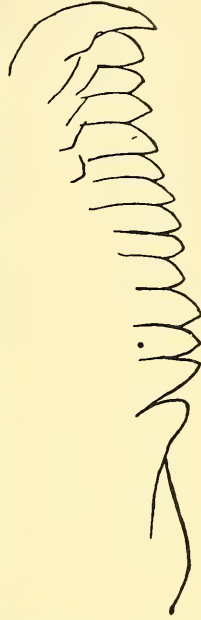
1893. *Orphnaeus* (*Aspidopleres*) *intercalatus* Porat, Bih. Sv. Ak. Handl., xviii, iv, pp. 7, 15.

(Pl. XIX, figs. 461–464; text-figs. 30–34.)

I am glad to be able to describe this species, which has not been recorded since it was first described by Porat.

Colour, pale brownish-yellow; head not darkened. Length 115 mm., width 32 mm.; flattened and sharply narrowed in front and

behind. 93–105 pairs of legs. Head-plate broader than long, bluntly conical in front, smooth, not punctate, hairless. No frontal sulcus. Antennae awl-shaped, very thick and somewhat compressed dorso-ventrally at the base, tapering gradually, very short, reaching to the anterior margin of the maxillipedes. The first six joints with dorsally and laterally dispersed hairs, ventrally hairless, the remaining joints with dense, minute hairs, without long bristles. Clypeus with moderately dense, short, and fine hairs, not elevated in the middle. Labrum consisting of one piece nearly completely fused with the clypeus, rounded and weakly prominent in the middle, the free margin with numerous teeth, somewhat blunt in the middle, pointed laterally (fig. 464). Mandible with 7–8 pectinate lamellae, the outer 2–3 somewhat irregular and close together. Each lamella long and slender, its axis on that of the whole mandible. The teeth strong and blunt (text-fig. 30). The inner lamella does not differ in colour or size of teeth.

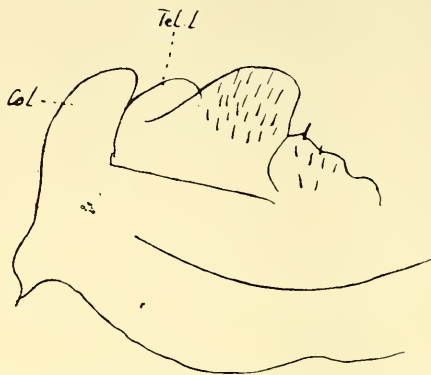


TEXT-FIG. 30.—*Aspidopleres intercalatus* Por. One pectinate lamella of the mandible.

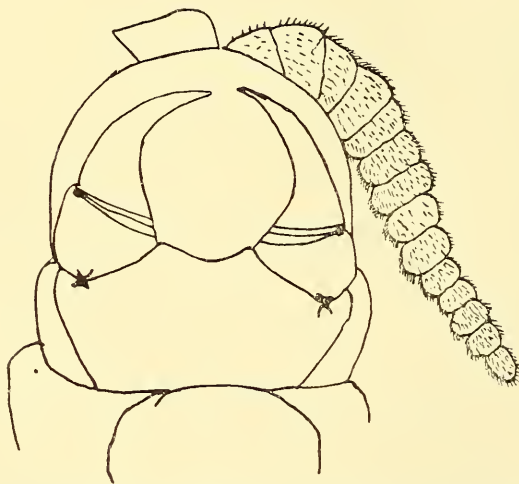
First maxillae (text-fig. 31) with complete syncoxite, the coxal processes pubescent, not separated by a fold. On each side one broad lobe covered with microscopical scales (fig. 462). The two joints of the telopodite completely fused. In the middle of the lateral margin a similar lobe (*Tel.l*) to that on the coxa; the top of the telopodite pubescent. Second maxillae (fig. 461) densely pubescent in all parts. Syncoxite, telopodite 3-jointed, short, claw pectinate in the distal half (fig. 463). Coxae of maxillipedes (text-fig. 32) short and broad, without chitinous lines; the anterior margin evenly sinuate. All the joints without teeth, the first three joints of the telopodite very short; the tarsungulum very large, the claw very strong, but not going beyond the frontal margin.

The first tergite has a transverse groove or excavation along its anterior border as long as half this border, and the posterior margin of the head-plate fits into this excavation like a condyle. Tergites slightly wrinkled, with two shallow longitudinal grooves, no sharp sulci. The intercalary tergites appear behind the fourth main tergite. Sternites rectangular, broader than long, with a shallow median

furrow, indistinct on the anterior segments. The first sternite meets the coxae of the maxillipedes. The intercalar sternites are visible only in the posterior half of the body as little gussets, not meeting in



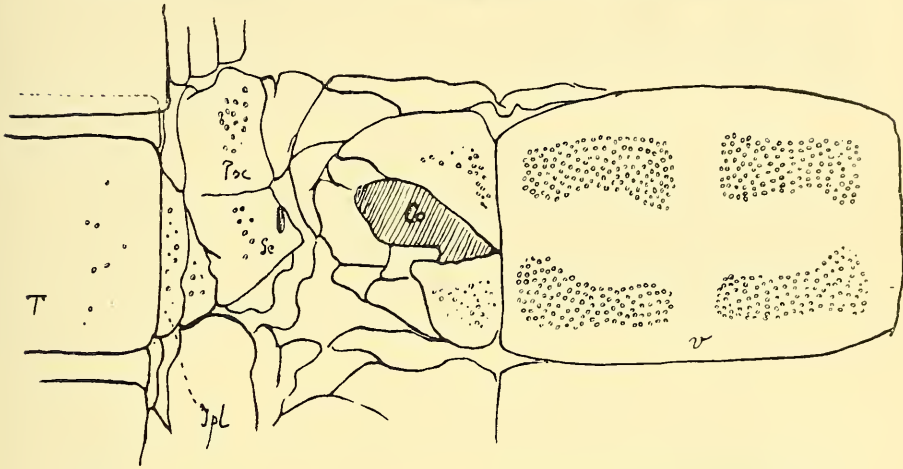
TEXT-FIG. 31.—*Aspidopleres intercalatus* Por. First maxilla.



TEXT-FIG. 32.—*Aspidopleres intercalatus* Por. Anterior end of ♂, ventral surface.

the middle line. Scutellum and praescutellum not separated on the anterior segments up to the tenth. Anterior segments with one row of paratergites. From the eighteenth segment, a second row above the scutellum (text-fig. 33), and from the fortieth segment the second row is present also above the praescutellum. On the posterior segments the second row of paratergites disappears gradually, first

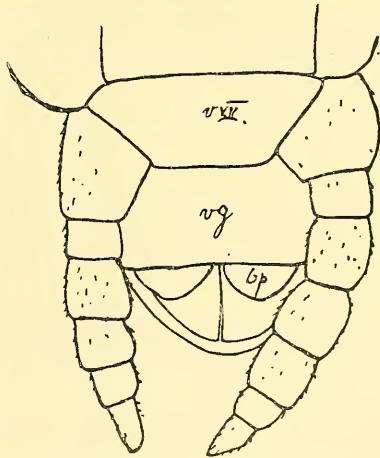
the sclerites above the praescutellum, then those above the scutellum. Stigmata elongated, oval. Ventral pores very small and numerous,



TEXT-FIG. 33.—*Aspidopleres intercalatus* Por. Twenty-sixth segment of ♀.

arranged in two broad transverse bands not connected at the sides, and each interrupted in the middle; it would be therefore more correct to say, arranged in four areas (text-fig. 33). The same pores are present on the pleurites and tergites.

Last legs 7-jointed, moderately incrassate in the ♀. ♂ not known. Coxae small and smooth, non-porose. The terminal joint conical, without a claw. (One female in the collection has on the right side a 6-jointed leg, the left is regular and 7-jointed. The length of the joints 1-6 in the two legs is not the same, as shown in the drawing.) Sternite broad and short, trapezoidal, hairless. In the genital region of the ♀ (text-fig. 34) only the sternite of the genital segment, bearing the 2-jointed, broad, medially-meeting



TEXT-FIG. 34.—*Aspidopleres intercalatus* Por. Posterior end of ♀, ventral view.

gonopods, is visible. The sternite of the praegenital segment is not visible. The whole genital region is almost hairless. ♂ unknown.

Namies, Gr. Bushmanland (7542), Ababis (B. 1007), S.W. Africa. Otjiwaronga, S.W. Africa; Omaruru, Damaraland (Poc.). Omaruru, Kuibis, Seeheim (Michaelsen).

Gen. ORPHNAEUS Mein.

1870-71. Meinert, Myr. Mus. Haun., i, Geoph., p. 17.

1886. Meinert, Proc. Amer. Phil. Soc., xxiii, p. 230.

1902. Saussure, Zehnter, Grandidier, Madagascar, p. 335.

1903. Attems, Synopsis Geoph., p. 200.

1909. Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 6.

Key to the Species of *Orphnaeus*.

- 1a. Sternite of last legs narrow and long; 127 pairs of legs . . . *mexicanus* H. S.
- 1b. Sternite of last legs short and broad; 67-113 pairs of legs 2.
- 2a. Sternite of last legs sinuate posteriorly; 113 pairs of legs . . . *bohlsi* Att.
- 2b. Sternite of last legs posteriorly truncate 3.
- 3a. Ventral pores arranged in one closed quadrate area . . . *brasilianus* H. S.
- 3b. Ventral pores arranged in four areas (except on the first segments) . . . 4.
- 4a. Ventral pores present on the posterior segments in great numbers and arranged in four areas; 81 pairs of legs *brevilabiatus* Newp.
- 4b. The anterior two areas of the posterior sternites reduced to a few pores; 67-73 pairs of legs *meruinus* Att.

60. *Orphnaeus brevilabiatus* Newp.

1870. *Orphnaeus lividus* Meinert, Myr. Mus. Haun., i, p. 19.

1886. *Orphnaeus lividus* Meinert, Proc. Amer. Phil. Soc., xxiii, p. 231.

1887. *Orphnaeus brevilabiatus* Haase, Indo-Austral. Myr., p. 111.

1895. *Orphnaeus brevilabiatus* Pocock, Biol. Centr. Amer., pl. iii, fig. 14.

This widespread species is represented in the collection of the Museum by a single specimen from Messina, N. Transvaal (4070).

Distribution.—Zanzibar, Cameroon, Erythrea (Abyssinia), Central and South America, India (Java, Celebes, Flores, Borneo, Burma, Madras, Ceylon), Japan, Kei and Aru Island, Sandwich Islands, New Guinea, S.W. Australia, etc.

61. *Orphnaeus meruinus* Att.

1909. *Orphnaeus meruinus* Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 5.

Masiene, Portuguese E. Africa (5999) 2 ♀, length 75 and 90 mm. with 71 and 69 pairs of legs.

Distribution.—Kilimandjaro, Meru.

Distribution of the remaining species :

Orphnaeus bohlsi Att., Paraguay.

Orphnaeus polypodus Silv.,* Paraguay.

Orphnaeus brasiliannus H. S., Central and S. America (Cameroon) (?).

Orphnaeus brasiliannus nigropictus Att., Madagascar, Nossi Bé.

Orphnaeus mexicanus Sauss., Mexico, Texas.

Gen. CTENORYA Ck.

1896. Cook, Brandtia, vii.

Cook published a genus *Ctenorya* with type species *C. jombene* from East Africa, but gave no description of this species.

Later I described another species, *Ctenorya sjöstedti*, from Meru (Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 7).

Gen. PARORYA Ck.

1896. Cook, Brandtia, vii, p. 33.

Cook only published the name of the type species from Texas ; it is a nomen nudum.

Gen. PENTORYA Ck.

1896. Cook, Brandtia, vii, p. 34.

Type species *P. fusata* Porat, Cameroon.

Gen. HENIORYA Ck.

1896. Cook, Brandtia, vii, p. 34.

Type species *H. longissima* Ck., from Brazil ; also a nomen nudum.

Gen. NOTIPHILIDES Latzel.

1880. Latzel, Zool. Anz., iii, pp. 68, 546.

1880. Latzel, Myr. Ost. Ung. Mon., i, p. 20.

* Description inadequate.

1886. Meinert, Proc. Amer. Phil. Soc., xxiii, p. 233.

1903. Attems, Synopsis Geoph., p. 205.

Two species, *N. maximiliani* H. S. and *N. grandis* Bröl., from South America.

2. Subfam. TREMATORYINAE Bröl.

Coxae of terminal legs with two pores each ; some of the sternites with a median pore.

Gen. TREMATORYA Bröl.

1909. Brölemann, Arch. Zool. Exp. Gen., (5), vii, p. 333.

T. sternalis Bröl., Chile.

Fam. MECISTOCEPHALIDAE Verh.

1901. Subfam. *Mecistocephalinae* Verhoeff, Beitr. z. K. Pal. Myr., xvi.

1903. Subfam. *Mecistocephalinae* Attems, Synop. d. Geoph., pp. 166, 207.

1908. Fam. *Mecistocephalidae* Verhoeff, Bronn's Class. u. Ordn., p. 271.

1909. Fam. *Mecistocephalidae* Brölemann, Arch. Zool. Exp. Gen., (5), iii.

1914. Fam. *Mecistocephalidae* Attems, Indo-Austral. Myr., p. 130.

1926. Fam. *Mecistocephalidae* Attems, Kükenthal's Handb. d. Zool., iv, p. 355.

Gen. MECISTOCEPHALUS Newp.

1842. *Mecistocephalus* Newport, Proc. Zool. Soc. London, x, p. 178.

1895. *Lamnonyx* Cook, Proc. U.S. N. Mus., xviii, p. 61.

1903. *Lamnonyx* Attems, Zool. Jahrb. Syst., xviii, p. 210.

1908. *Lamnonyx* Verhoeff, Bronn's Class. u. Ordn., 5, ii, p. 273.

1919. *Lamnonyx* Silvestri, Rec. Ind. Mus., xvi, p. 49.

1920. *Mecistocephalus* Chamberlin, Canad. Ent., lii, p. 1894.

1926. *Mecistocephalus* Attems, Kükenthal's Handb. d. Zool., iv, p. 357.

62. *Mecistocephalus insularis* (Luc.)

1863. *Geophilus insularis* Lucas, Maillard, Note Ile de Réunion, Annex 10, Tab. xxi, fig. 1.

1900. *Mecistocephalus punctifrons* var. *glabridorsalis* Attems, Zool. Jahrb. Syst., xiii, p. 138.

1914. *Lamnonyx punctifrons* Ribaut, Afrique Orientale, p. 17, Tab. i, figs. 9-12; Tab. ii, figs. 13-15.

1919. *Lamnonyx insularis* Silvestri, Rec. Ind. Mus., xvi, p. 55, fig. 4.

1896. *Lamnonyx togensis*, Cook, Brandtia, viii, p. 39.

Mecistocephalus punctifrons Newp. in the old sense has recently been divided into several species by Silvestri, one of them is *M. insularis* (Luc.). He considers all the African specimens as *Mecistocephalus insularis* (Luc.), and says that in *M. punctifrons* the angle of the chitinous edges in the sternites is acute, while in *M. insularis* this angle is either a right angle or obtuse. The drawings, fig. 3, p. 7 (*L. punctifrons* var. *sulcicollis*) and fig. 6, p. 7 (*L. insularis* var. *orientalis*), are quite identical, and prove clearly that this character is valueless as the only difference between the two "species."

M. insularis has reached South Africa also, but it seems to be very rare, since only one specimen has been found, at Baviaans Kop, three miles east of Umtali, Southern Rhodesia (13721).

Fam. SCHENDYLIDAE Ck.

1895. Fam. *Schendylidae*+*Ballophilidae* Cook, Arrangement of Geoph., Proc. U.S. N. Mus., No. 18.

1896. Fam. *Schendylidae*+*Ballophilidae* Cook, Brandtia, viii, p. 36.

1901. Subfam. *Geophilini*, Tribe *Schendylini* Verhoeff, Beitr. z. K. Pal. Myr., xvi.

1908. Fam. *Schendylidae* Verhoeff, Bronn's Class. u. Ordn., p. 275.

1909. Subfam. *Schendylinae* Brölemann, Arch. Zool. Exp. Gen., (5), iii.

1912. Fam. *Schendylidae* Chamberlin, Canad. Ent., xlv, p. 65.

1914. Fam. *Schendylidae* Attems, Indo-Austral. Myr., p. 113.

1926. Fam. *Schendylidae* Attems, Kükenthal's Handb. d. Zool., iv, p. 350.

The general morphology is treated in an excellent monograph of the *Schendylinae* by Brölemann and Ribaut, mentioned below, so that I need not enlarge on it.

The sensitive spots on certain joints of the antennae (generally the ninth and thirteenth joints), first described by me in *Thalathybius* and then in other species by Brölemann and Ribaut, seem to be a speciality of the *Schendylidae*, though not of all species. They are well developed in all *Ballophilidae* and in *Pectiniunguis melanostictus* (fifth and ninth joints). They are wanting in *Escaryus retusidens*

and *Escaryus sibiricus*, *Pectiniunguis europaeus*, *Pectiniunguis pluriodontus*, *Schendylurus maroccanus*, *Schendylurus polytypus*, *Mesoschendyla caledonica* and *Mesoschendyla monopora*. Other families have not yet been examined with regard to this character.

1. Subfam. SCHENDYLINAE.

1895. Fam. *Schendylidae* Cook, Arrangement of Geoph.
 1896. Fam. *Schendylidae* Cook, Brandtia, viii, p. 26.
 1901. Sectio *Schendylini* Attems, Synop. d. Geoph., Zool. Jahrb., xviii, p. 185.
 1909. Tribe *Schendylini* Brölemann, Arch. Zool. Exp. Gen., (5), iii.
 1914. Subfam. *Schendylinae* Attems, Indo-Austral. Myr., p. 114.
 1926. Tribe *Schendylini* Attems, Kükenthal's Handb. d. Zool., iv, p. 352.

Body pale, without dark pigment. Labrum deeply sinuate and strongly toothed. Antennae filiform. Ventral porose area not elevated.

Distribution.—Palearctic Region, North America, South America, Antilles, India, West Africa, South Africa.

1. Tribe *Schendylini* Att.

1903. Tribe *Schendylini* Attems, Synop., Zool. Jahrb., xviii, p. 185.
 1908. Subfam. *Schendylinae* Verhoeff, Bronn's Class. u. Ordn., p. 275.
 1909. Subtribe *Schendylina* Brölemann, Arch. Zool. Exp. Gen., (5), iii.
 1911. Subtribe *Schendylina* Brölemann et Ribaut, Bull. Soc. Ent. Fr., No. 8, p. 191.
 1912. Subtribe *Schendylina* Brölemann et Ribaut, Monograph Schendylina, Nouv. Arch. Mus. Paris, (5), iv.

Coxae of last legs with one or two pores, terminal claw wanting.

Distribution.—The same as for the subfamily.

The South African genera may be distinguished by the following key extracted from that given by Brölemann and Ribaut:—

- 1a. Both edges of claw of second maxillae pectinate, the teeth continuous for nearly the whole length 2.
 2a. Each coxa of the last legs with one gland (and pore) . . . *Mesoschendyla* Att.
 2b. Each coxa of the last legs with two glands (and pores) 3.
 3a. The single lobes of the glands of the last coxa distinct, with short ducts discharging into a common cavity, which opens by a single pore
Pectiniunguis Boll., *Adenoschendyla* B. R., *Pleuroschendyla* B. R.

- 3b. All the glands of the last coxae homogeneous, opening by a single unramified canal 4.
 4a. Last legs 7-jointed *Schendylurus* Silv.
 4b. Last legs 6-jointed *Nannophilus* Ck.
 1b. Claw of second maxilla simple or beset with bristles contiguous only at their bases . . . *Haploschendyla* Verh., *Hydroschendyla* B. R., *Schendyla* Bergs. and Mein., *Brachyschendyla* B. R.

Gen. MESOSCHENDYLA Att.

1909. Subgen. *Mesoschendyla* Attems, Schultze's Forsch. Reise, p. 19.

1911. Gen. *Mesoschendyla* Bröle-
mann et Ribaut, Bull.
Soc. Ent. Fr., p. 192.

1912. Gen. *Mesoschendyla* Bröle-
mann et Ribaut, Monogr.
Schendyl., p. 132.

Distribution.—South Africa. Two species.

63. *Mesoschendyla monopora* Att.

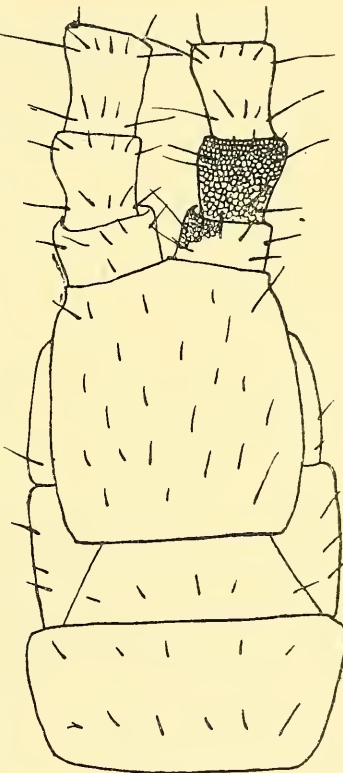
1909. Attems, Schultze's Forsch.
Reise S.W. Afr., p. 17.

Possession Island, south of Lüderitzbucht; Kamaggas, Little Namaqualand, Lüderitzbucht, and Penguin Island, near Lüderitzbucht (Michael-
sen).

64. *Mesoschendyla caledonica* n. sp.

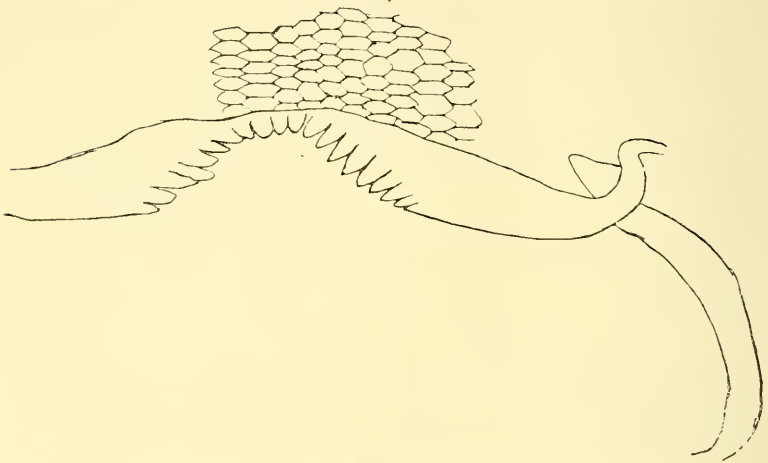
(Pl. XIX, figs. 457-460; text-
figs. 35-38.)

Colour yellowish; the anterior segments darker. Slender, length 65 mm.; ♂ with 83 or 85 pairs of legs. Head-plate (text-fig. 35) somewhat longer than broad, narrowed in front and behind; the posterior margin rectilinear, with scattered punctation and hairs. Clypeus reticulate, and several (ca. 4) irregular transverse rows of strong bristles. Antennae tapering; the first five joints with polygonal



TEXT-FIG. 35.—*Mesoschendyla caledonica* Att. Anterior end, dorsal surface.

reticulation dorsally and ventrally, with two whorls of long bristles, the small hairs beginning on the fourth joint. The groove of the last joint shallow, with numerous papillae. First to thirteenth joints without sense-papillae. Labrum entirely fused with the clypeus, consisting of one piece, deeply sinuate, the whole sinus dentate, the teeth in the middle shorter and blunter (text-fig. 36). The dentate lamella of the mandible imperfectly divided into three portions, with 3, 2-3, 4 teeth. These portions are partially superposed (text-fig. 37, fig. 459). First maxillae (text-fig. 38, fig. 457) with two pairs of soft, hairless lobes, turned completely to

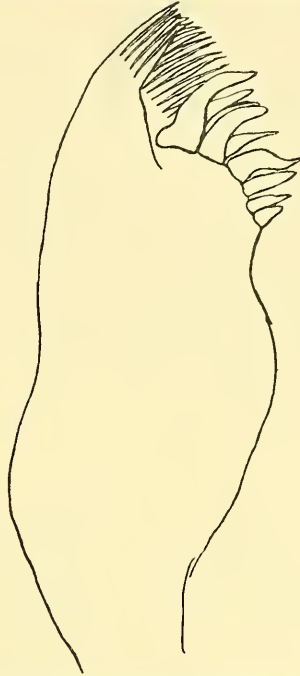


TEXT-FIG. 36 — *Mesoschendyla caledonica* Att. Labrum.

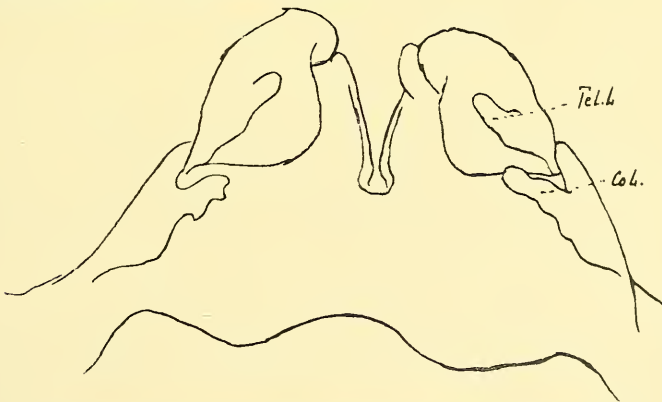
the aboral side. Coxal process with a fold at its base. Telopodite indistinctly 2-jointed. Some strong bristles on the coxal process and at the end of the telopodite. Second maxillae (fig. 457) with syncoxite, the opening of the gland large and distinct; the syncoxite is connected with the pleurae by a *soudure pleurocoxale empatée* in the sense of Brölemann and Ribaut. No process on the syncoxite or telopodite; terminal claw pectinate (fig. 460). Basal plate trapezoidal, the posterior angles distant from the sides of the body. The maxillipedes not extending to the frontal margin; all joints with scattered long bristles. No teeth. Coxae without chitinous lines. Claw simple. Praebasal plate not visible.

Tergites bisulcate; the sulci pass into a groove along the posterior border, consequently three elevated areas result, the median of which is narrower, the laterals broader. At the sides of the tergites long

bristles; the rest of the body very sparsely pubescent, nearly hairless. The sternites and pleurites of the first 26 or 27 segments are polygonally reticulated in a very remarkable manner and look as if tessellate. The reticulation of the following somites becomes gradually less marked. Anterior margins of the sternites bluntly angular, the anterior prominences weakly hollowed out and the meshes of the reticulation fewer. On each side of the sternite two long bristles, the rest of the surface with dispersed short hairs. The porose area, from the second to the penultimate pedal segment, circular or transversely oval in the posterior half of the sternite. The intercalary sternites are divided medially in the anterior third of the body. Further back they are undivided. Sternite of the last pedal segment (fig. 458) very broad, with a deep incision behind. The posterior half densely pubescent, the same pube-



TEXT-FIG. 37.—*Mesoschendyla caledonica* Att. Mandible.



TEXT-FIG. 38.—*Mesoschendyla caledonica* Att. First maxillae.

scence on the posterior and inner part of the coxa and on the ventral side of the third to fifth joints; the sixth and seventh joints with

dispersed long hairs. Each coxa with one large pore close to the margin of the sternite.

Joints 1-6 of the last leg incrassate, more so in the ♂ than in the ♀, the seventh joint slender, cylindrical; the difference in the thickness is consequently greater in the ♂; a similar case to that of *Schendyla nemorensis*. The seventh joint without a claw, but with two little spines at the end, while the bristles of this joint are very long. The top cone of the seventh joint is not separated by an articulation, as Ribaut observed in *Schendylurus attemsi*.

Male genital appendages 2-jointed, with long bristles; the penis visible between them. The appendages of the female are broad, rounded plates meeting each other.

Caledon, Venster Ravine; Zonder End Mts. (4100).

The differences between this species and *monopora* are as follows:—

	<i>M. caledonica.</i>	<i>M. monopora.</i>
Pairs of legs . . .	83-85.	57-63.
Ventral pores present on: . . .	Second to penultimate segment.	Second to thirtieth or thirty-second segment.
Last sternite . . .	Deeply incised.	Broadly rounded.
Præbasal plate . . .	Not visible.	Visible.
Antennae . . .	Joints 1-5 polygonally reticulate. The basal joints with whorls of long bristles; the small hairs beginning on the fourth or fifth joint.	Only the first joint reticulated. The small hairs beginning on the first joint and the bristles inconspicuous.

Gen. SCHENDYLURUS Silv.

1907. Silvestri, Jahrb. Hamb. Wiss. Anst., xxiv, p. 245.

1911. Brölemann et Ribaut, Bull. Soc. Ent. Fr., p. 192.

1912. Brölemann et Ribaut, Monogr. Schendyl., p. 113.

1914. Chamberlin, Chil. Brasil, Bull. Mus. Harvard Coll., lviii, p. 196.
Brölemann and Ribaut distinguish two subgenera:

Subgen. SCHENDYLURUS Bröl. et Rib.

1912. Brölemann et Ribaut, Monogr. Schendyl., p. 115.

Ventral pores present only in the anterior half of the body. Teeth of the labrum all contiguous at the base, the form changing gradually from the median to the lateral teeth.

Distribution.—Africa: North Africa (Morocco), South Africa.

Subgen. PLUTOSCHENDYLURUS Bröl. et Rib.

1912. Brölemann et Ribaut, Monogr. Schendyl., p. 114.

Ventral pores present in the anterior and posterior half of the body. The lateral teeth of the labrum distant from each other, hooked, and very different in form from the median teeth.

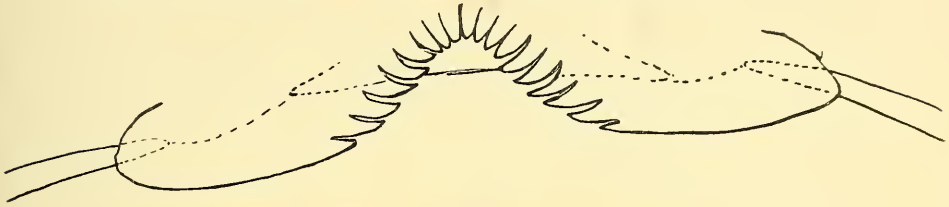
Distribution.—America.

In contradiction to their own diagnosis the authors put *Schendylurus lüderwaldi* (with ventral pores only on the first thirteen segments) into the subgenus *Plutoschendylurus*. I think it is better not to divide the genus *Schendylurus*, because, if we put *S. lüderwaldi* simply into the subgenus *Schendylurus*, this subgenus would not be uniform, and it seems not convenient to me to make a third subgenus for *S. lüderwaldi*, the differences between the species of the whole genus not showing clearly the common origin of two or three groups of species.

Key to the Species of Schendylurus.

- 1a. Last legs with praetarsus, a little setiferous cone. Ventral porose area circular, present only in the anterior half of the body 2.
- 2a. The lateral teeth of the labrum of the same length and form as the median teeth. Ventral pores present up to the twentieth segment. Last legs of ♂ incrassate, the seventh joint abruptly thinner than the sixth joint. Beside the last praetergite a well-developed pleurite *attemsi* Verh.
- 2b. The lateral teeth of the labrum very different in length and form from the median teeth. Ventral pores present up to the twenty-first segment. Last legs in both sexes nearly equal, not incrassate in the ♂, the seventh joint nearly as thick as the sixth joint. Beside the last praetergite no pleurite *maroccanus* Att.
- 1b. Last legs without praetarsus 3.
- 3a. Ventral pores present only in the anterior half of the body 4.
- 4a. The ventral pores of sternites 2-13 are divided into three areas. 41 pairs of legs. (South America) *lüderwaldi* Bröl. et Rib.
- 4b. The ventral porose area is not divided 5.
- 5a. ♂ and ♀ with 53 pairs of legs. The last joint of the last legs of the ♂ and ♀ thick and conical, its base as thick as the end of the sixth joint. The labrum partially separated by a slit from the clypeal margin. Labral sinus shallow, labral teeth short and blunt *australis* Silv.
- 5b. ♂ with 69, ♀ with 77 pairs of legs. The last joint of the last legs of the ♀ cylindrical, and abruptly thinner than the sixth joint
polypus n. sp.
- 3b. Ventral pores present in the anterior and posterior half of the body 6.
- 6a. First sternite with porose area. The area on sternites 19-42 is divided
tropicus Bröl. et Rib.
- 6b. First sternite without porose area 7.

has 9 teeth on one and 8 teeth on the other mandible, and we therefore cannot attribute too high a value to the number of teeth.

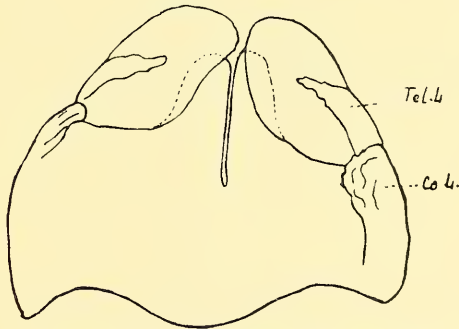


TEXT-FIG. 39a.—*Schendylurus polypus* Att. Labrum.

First maxillae (text-fig. 41) with two pairs of soft lobes, turned towards the oral side and visible only from this side. The lobes of the syncoxite very short. The boundary between the joints of the telopodite indistinct on the oral side, distinct on the aboral side.



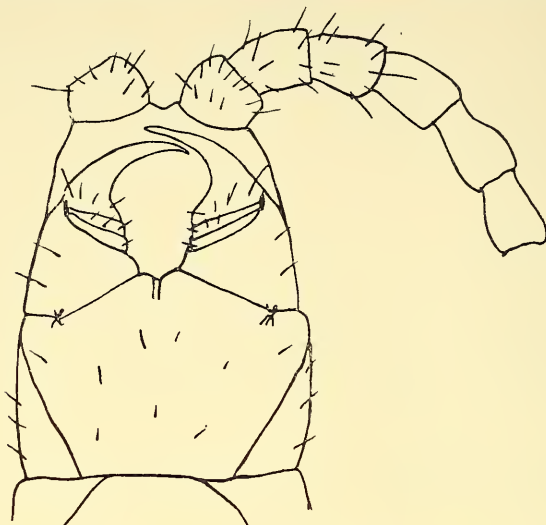
TEXT-FIG. 40.—*Schendylurus polypus* Att. Mandible.



TEXT-FIG. 41.—*Schendylurus polypus* Att. First maxillae.

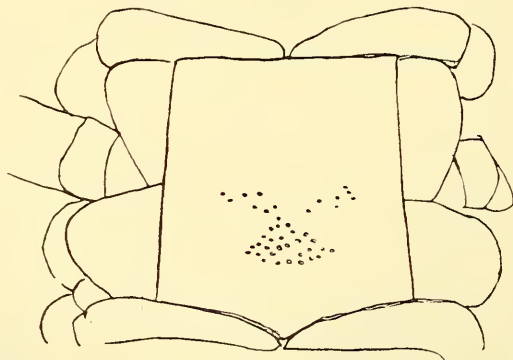
Second maxilla (fig. 468) with undivided syncoxite. Both edges of the claw pectinate (fig. 469). Basal plate broad, nearly as broad behind as the following tergite; trapezoidal. Maxillipedes (text-fig. 42) without chitinous lines; the anterior margin sinuate, all joints without teeth. The claws, if closed, distant from the frontal margin. Claw smooth. The pleurocoxal suture is oblique, and reaches the lateral margin of the body after traversing three-quarters of the length of the coxa.

Tergites bisulcate, hairless. Ventral side of the anterior half of the body with polygonal reticulation; the hairs are minute, sparse,



TEXT-FIG. 42.—*Schendylurus polypus* Att. Maxillipedes.

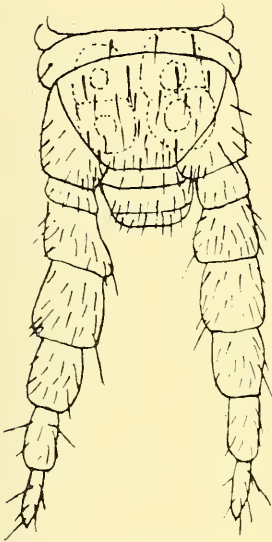
and scarcely visible. In the posterior half of the body the hairs are longer. On each side of the sternites two long bristles. The sternites



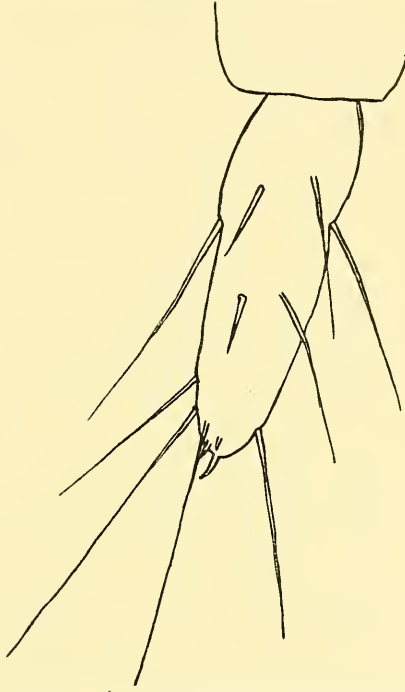
TEXT-FIG. 43.—*Schendylurus polypus* Att. Fourteenth segment, ventral side.

before the last segment with two transverse rows of bristles. The intercalary sternites in the anterior half of the body are separated by the bluntly angular prominence on the posterior margin of the preceding segment. From the middle of the body they are undivided.

All segments have a row of little bristles, becoming very large on the last four segments. Ventral pores present on segments 2-23, the area irregularly triangular with rounded angles and two small strips issuing from the anterior angle in an oblique and divergent direction (text-fig. 43). The second and twenty-third segments with very few pores. Sternite of the last legs very broad, nearly one and a half



TEXT-FIG. 44.—*Schendylurus polypus* Att. Posterior end of ♀, ventral view.



TEXT-FIG. 45.—*Schendylurus polypus* Att. Terminal joints of last leg of ♀.

times as broad as long, truncate behind, laterally convex, abundantly pubescent (text-fig. 44); the bristles of the plane surface long, on the posterior margin short and dense.

Last legs 7-jointed (♀), pubescent; the coxa with two large pores concealed by the margin of the sternite. Each gland with one simple duct opening by the pore. The glands of the same side separated by a little space. The seventh joint of the female as long as the sixth joint, but much more slender, cylindrical, beset with dispersed long bristles; at the tip some short points; but the cone at the tip is not

separated by a line from the rest of the joint as described by Ribaut in *Schendylurus attemsi* (text-fig. 45).

Triangle, Worcester (7442), Cape.

2. Tribe *Escaryini* Att.

1903. Tribe *Escaryini* Attems, Synop. d. Geoph., Zool. Jahrb., xviii, pp. 168, 186.

1908. Subfam. *Escaryinae* Verhoeff, Bronn's Class. u. Ordn., p. 276. Coxae of last legs with numerous pores. Terminal claw present.

Gen. ESCARYUS Ck.

Distribution.—Palaearectic and Nearctic Regions.

2. Subfam. BALLOPHILINAE Ck.

1895. Fam. *Ballophilidae* pt. Cook, Arrangement of Geoph., p. 69.

1896. Fam. *Ballophilidae* pt. Cook, Brandtia, viii, p. 26.

1903. Sectio *Ballophilini* Attems, Synop. d. Geoph., pp. 167, 172, 183.

1908. Subfam. *Ballophilinae* Verhoeff, Bronn's Class. u. Ordn., p. 276.

1909. Tribe *Ballophilini* Brölemann, Arch. Zool. Exp., (5), iii.

1914. Subfam. *Ballophilinae* Attems, Indo-Austral. Myr., p. 114.

1926. Tribe *Ballophilini* Attems, Kükenthal's Handb. d. Zool., iv, p. 353.

Well pigmented; the ventral glands shining through the skin as blackish spots. Anterior part of the body behind the head neck-like and narrowed. Labrum weakly developed, fused with the clypeus. The free border straight, or nearly so, never toothed in the middle, sometimes some weak teeth at the sides. Antennae generally with thick terminal club; in *Diplothmus* the club is weak. Ventral porose area elevated. Dentate lamella of the mandible not divided into sections. Syncoxite of the first maxillae without lateral lobes, telopodite 2-jointed. The first joint with or without lateral lobe. The syncoxite of the second maxillae sometimes with traces of an imperfect median suture (in *Ballophilus alluaudi* it is said to be complete). Telopodite 3-jointed. Claw pectinate. Coxae of maxillipedes with or without chitinous lines. Last legs 7-jointed, much incrassate, without claw, coxa with one or two large pores.

Distribution.—Central and South America, Marianne Islands, Seychelles, South Africa.

Key to the Genera of Ballophilinae.

- 1a. Ventral pores arranged in two areas side by side ; terminal club of antenna weak (Mexico, Columbia) *Diplothmus* Ck.
- 1b. Ventral pores in one single median area ; terminal club of antenna thick 2.
- 2a. Maxillipedes without chitinous lines *Ballophilus* Ck.
- 2b. Maxillipedes with chitinous lines 3.
- 3a. Ventral porose area elliptical or oval. Sternite of last legs a little narrowed behind, trapezoidal (Brazil, Marianne, Seychelles) *Thalhybius* Att.
- 3b. Ventral porose area nearly circular. Sternite of last legs triangular (Florida) *Ityphilus* Ck.

Gen. BALLOPHILUS Ck.

- 1895. Cook, Arrangement of Geoph., Proc. U.S. N. Mus., xviii, p. 70.
- 1896. Cook, Brandtia, viii, p. 36.
- 1899. Cook, Geoph. Florida Keys, Proc. Ent. Soc. Wash., iv, p. 206.
- 1901. Attems, Synop. d. Geoph., p. 185.
- Distribution*.—East and West Africa ; Java.
- Hitherto six species have been described.

(1) *B. alluaudi* Rib.

- 1914. Ribaut, Afrique Orientale, p. 21.
- British East Africa.

(2) *B. australiae* Chamb.

- 1920. Chamberlin, Bull. Mus. Harvard, lxiv, p. 37.
- Queensland.

(3) *B. braunsi* Silv.

(See below.)

(4) *B. clavicornis* Ck.

- 1895. Cook, Proc. U.S. N. Mus., xviii, p. 70 (name only).
- 1896. Cook, Brandtia, viii, p. 37.
- Liberia.

(5) *B. kraepelini* Att.

- 1907. Attems, Javan. Myr., Mitt. Mus. Hamb., xxiv, p. 92.
- Java.

(6) *B. neocaledonicus* Rib.

- 1923. Ribaut, Nova Caledonia, iii, p. 72.
- New Caledonia.

(7) *B. polypus* Att.

1907. Attems, Javan. Myr., Mitt. Mus. Hamb., xxiv, p. 93.
Java.

(8) *B. rouxi* Rib.

1923. Ribaut, Nova Caledonia, iii, p. 78.
New Caledonia, Loyalty Is.

(9) *B. maculosus* (Por.).

1895. *Geophilus maculosus* Porat, Bih. Sv. Ak. Handl., xx, p. 25.
Cameroon.

The descriptions of *B. clavicornis* and *B. maculosus* are insufficient and we cannot make use of them.

Key to the Species of *Ballophilus*.

- 1a. Coxa of anal legs with one pore 2.
 - 2a. 45-47 pairs of legs; the body pale yellow; the pore area oval, lying in the middle of the sternite *kraepelini* Att.
 - 2b. 75 pairs of legs; the body greenish; the pore area with straight posterior margin, situated near the posterior border of the sternite . . . *polypus* Att.
 - 1b. Coxa of anal legs with two pores 3.
 - 3a. Terminal pores present 4.
 - 4a. Deep violet or black (Liberia, Togo) *clavicornis* Ck.
 - 4b. Bright ferruginous (Queensland) *australiae* Chamb.
 - 3b. No terminal pores 5.
 - 5a. The first and the last two sternites before the last pedigerous segment without pore area 6.
 - 6a. The last joint of the antenna pointed; twice as long as wide; the contents of the body greenish, at least in the anterior and posterior parts of the body *neocaledonicus* Rib.
 - 6b. The last joint of the antenna conical and blunt, as long as wide. The contents of the body not dark coloured *braunsi* Silv.
 - 5b. The last four sternites before the last pedigerous segment without pore area . 7.
 - 7a. The contents of the body green. The last joint of the antenna one and a half times as long as wide. The head-plate longer than wide . . . *rouxi* Rib.
 - 7b. The contents of the body not dark coloured. The last joint of the antenna as long as wide. The head-plate as long as wide . . . *alluaudi* Rib.
- Ballophilus figiensis* Chamb. and *B. paucipes* Chamb. cannot be placed here.

67. *Ballophilus braunsi* Silv.

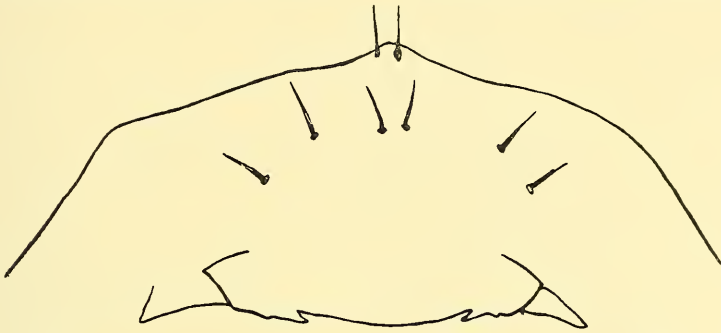
1907. Silvestri, Neue Wen. Bek. Myr., Mitt. Nat. Mus. Hamb.,
xxiv, p. 244.

(Pl. XIX, fig. 467; Pl. XXV, figs. 553, 554; text-figs. 46-51.)

Colour brownish-yellow; the ventral glands shine through the skin as star-shaped black spots. (The animals have been preserved in

alcohol for twenty-five years; the original colour was perhaps different.) The greatest width is in the posterior half of the body; behind the head is a neck-like constriction. ♀ with 57–59, ♂ with 51–61 pairs of legs. (Only one ♀ with 51 pairs, generally 59–61 pairs.)

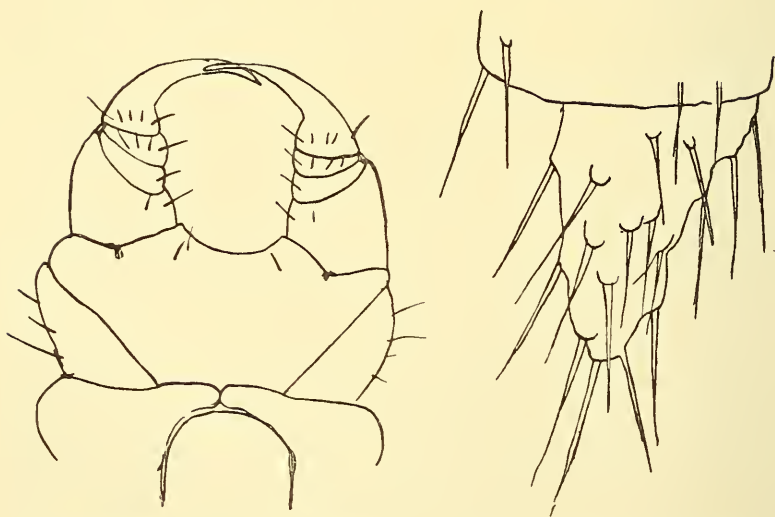
The club of the antenna (figs. 553, 554) is formed by the last six joints. Joints 1–8 with two whorls of long bristles, joints 9–14 densely pubescent with short hairs ventrally. The last joint as long as the two preceding ones together. The different sense-hairs described in *alluaudi* by Ribaut are present also in this species. Of the first kind, viz. short, conical bristles, three are present on the dorsal side of the ninth and thirteenth joints, situated close together on the inside. The second kind of hair, short and cylindrical with a fine terminal point, is



TEXT-FIG. 46.—*Ballophilus braunsi* Silv. Clypeus and labrum.

present on several joints. Here these hairs are pale, not dark coloured as in *alluaudi*, and therefore inconspicuous. The material examined is limited, and I cannot say on which segments they are wanting. I saw them on segments 2, 3, 4, 9, 13.

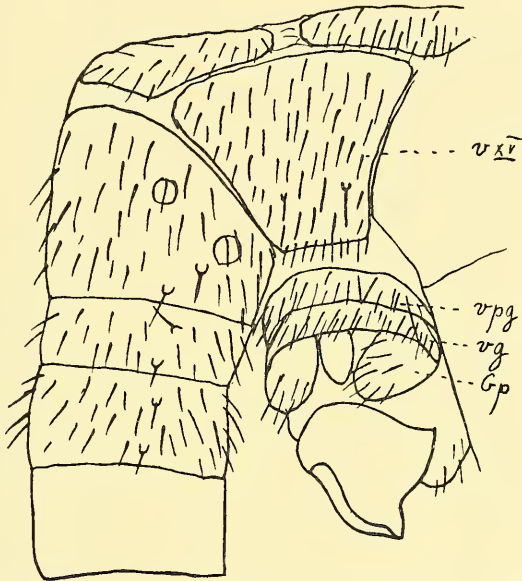
The labrum is short and fused with the clypeus. The free margin is provided laterally with one moderately distinct and one or two rudimentary teeth; the middle part is rectilinear and smooth (text-fig. 46). Clypeus short, the reticulation not distinct. Two post-antennal bristles close to the frontal margin, behind them six bristles in an arch. First maxillae (text-fig. 47) with two bristles at the base of the coxal process; the process hairless. The basal joint of the telopodite with a little lateral lobe turned to the oral side. Distal joints with one long bristle. Second maxillae: in the only specimen examined I could not see a median suture in the coxosternum. Ribaut found a suture in *alluaudi*, but possibly this observation is an error due to a rupture during preparation. Telopodite 3-jointed;

TEXT-FIG. 47.—*Ballophilus braunsi* Silv. Maxillae.TEXT-FIG. 48.—*Ballophilus braunsi* Silv.
Maxillipedes.TEXT-FIG. 49.—*Ballophilus braunsi*
Silv. Terminal joint of last leg
of ♂.

the second joint with one, the last joint with several long bristles. The superior edge of the claw with a broad, finely striated rim, the inferior edge with a smaller denticulate rim (fig. 467). Maxillipedes

without chitinous lines; the lateral borders greatly divergent; a great part of the pleurae visible. Anterior margin round and sinuate, all joints without teeth. Claw slender and pointed (text-fig. 48).

Tergites not sulcate, but polygonally reticulated and with irregular rows of granules bearing one hair each. The main tergites have 4-5, the intercalary tergites 2 rows of granules. The first, penultimate, and last sternite without porose area, the sternite before the penultimate with few pores; sternites twice as long as broad, with fine

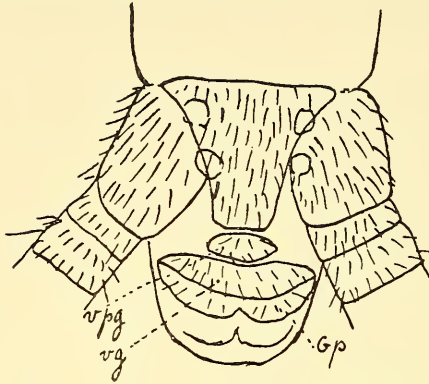


TEXT-FIG. 50.—*Ballophilus braunsi* Silv. Posterior end of ♂, ventral view.

polygonal reticulation. The porose area oval and transverse, elevated, and surrounded by a ring. The intercalary sternites are contiguous, but divided in the middle line. The whole trunk, tergites, sternites, and pleurites abundantly pubescent. The pleurae are as described by Ribaut in *B. alluaudi*. Sternites of last legs broad in front, narrowed and truncate behind, with numerous fine hairs. Last legs 7-jointed. Coxa with two large pores. Last joint with several bristles but without claw. Besides the normal bristles all the joints have others arising from a knob-shaped base (text-fig. 49). Of such bristles the coxa has 2, the trochanter 2, the praefemur 4, the femur 6, the tibia 8, the tarsus 5-6. No terminal pores. Sternite of the praegenital segment (text-fig. 50) broad in the ♂, a small

transverse plate in the ♀ (text-fig. 51); pubescent. Genital sternite also pubescent. Male genital appendages single-jointed, joints thick, short, conical; female appendages short, broad, medianly fused plates.

Silvestri says in the description of *B. braunsi*: "Lineis chitineis integris," and draws these lineae. All the specimens I saw from Cape



TEXT-FIG. 51.—*Ballophilus braunsi* Silv.
Posterior end of ♀, ventral view.

Province have no chitinous lines. Nevertheless, I believe that they belong to *B. braunsi*, and that the statement of Silvestri depends upon an error. All other species of *Ballophilus* hitherto known want these lineae, and *B. braunsi* is so easily recognisable by all the characteristics that I am sure that Silvestri's and my specimens belong to the same species.

Ribaut discovered two new species of *Ballophilus* from New Caledonia, and thinks that *S. braunsi*, *kraepelini*, and *polypus* cannot be put in the genus *Ballophilus* as defined by Cook, the first because of having chitinous lines, the two last because they have only one pore on the coxa of the anal legs. With respect to *B. braunsi*, see above. The difference of one pore or two pores on the anal legs is perhaps sufficient to make a subgenus, but not more.

Cape Province.—Table Mt., Platteklip Ravine (7876), Camps Bay (7732), Signal Hill (150113, 150108), Gordon's Bay, Stellenbosch Div. (A. 23397); Houw Hoek, Caledon (7347); Wellington, Paarl Div. (7298); Pass at Avontuur; Storms Vlei, Swellendam (7636); Knysna (5256). *Natal*.—Howick (150171).

Fam. GEOPHILIDAE Verh.

1895. Fam. *Geophilidae*+*Dignathodontidae* Cook, Proc. U.S. N. Mus., xviii, pp. 66, 71, 72.

1903. Subfam. *Pectinifoliinae* Attems, Synop. d. Geoph., pp. 166, 214.

1908. Subfam. *Geophilinae* Verhoeff, Bronn's Class. u. Ordn., p. 274.

1909. Subfam. *Geophilinae* Brölemann, Arch. Zool. Exp. Gen., (5), iii.
 1912. Fam. *Geophilidae* Chamberlin, Bull. Mus. Comp. Zool. Harvard Coll., xxiv, p. 410.
 1914. Fam. *Geophilidae* Attems, Indo-Austral. Myr., p. 124.
 1926. Fam. *Geophilidae* Attems, Kükenthal's Handb. d. Zool., iv, p. 357.

This family is the richest of the *Geophilomorpha*, and has been subjected to systematic rearrangement by several authors; how difficult its arrangement has been is proved by the different results arrived at. The old descriptions of the species are generally inadequate, not taking into account the characters recognised as important to-day. But even now, and even where we have the animals to examine, it is often difficult to determine the natural affinities of the genera. After having examined many forms I must change my own arrangement published in the Indo-Austral. Myr. in some points, principally with regard to the *Chilenophilinae* and *Pachymerinae*. First of all, I take the family *Aphilodontidae* Silv. as a subfamily of the *Geophilidae*. I had had no opportunity previously to examine a type of this group and could not therefore keep it in view. The genus *Geoperingueyia* is a link between the *Geophilinae* and *Aphilodontinae*, and the only character differentiating the *Aphilodontinae* from all other *Geophilidae* is the form of the telopodite of the maxillipedes. Besides the *Aphilodontinae* I distinguish four subfamilies: *Geophilinae*, *Dignathodontinae*, *Pachymerinae*, and *Chilenophilinae*. The last two especially are treated here in some detail as being the most numerous represented in the South African fauna, while the *Geophilinae* have only two, and the *Dignathodontinae* no species in South Africa.

Key to the Subfamilies of *Geophilidae*.

- 1a. Trochantero-praefemur and femur of the maxillipedes fused, the telopodite therefore 3-jointed (5) *Aphilodontinae* Silv.
 1b. The trochantero-praefemur and the femur separate, the telopodite of the maxillipedes therefore 4-jointed as usual 2.
 2a. One or two clypeal areas present. Pleurocoxal suture running parallel to the lateral margin 3.
 3a. Coxae of the second maxillae with long, thickened edge beside the gland opening (4) *Chilenophilinae* Att.
 3b. Coxae of the second maxillae without long, thickened edge. The gland opening surrounded by a thickened ring . . . (3) *Pachymerinae* Att.
 2b. No clypeal area. Pleurocoxal suture running obliquely to the lateral margin 4.

- 4a. Labrum not divided into a superior and an inferior lamella; the teeth or fringes of the median piece directed to the posterior end of the body; body not much narrowed anteriorly, the head often very large, at least as broad as the middle of the body (1) *Geophilinae* Bröl.
- 4b. Labrum divided into a superior lamella forming the median piece with the teeth directed to the anterior end of the body, and an inferior lamella forming the lateral pieces or rudimentals. The body much narrowed anteriorly, the head very small (2) *Dignathodontinae* Ck.

1. Subfam. GEOPHILINAE Bröl.

1909. Subtribe *Geophilina* Brölemann, Arch. Zool. Exp. Gen., (5), iii.
1914. Tribe *Geophilini* Attems, Indo-Austral. Myr., p. 125.
1926. Subfam. *Geophilinae* Attems, Kükenthal's Handb. d. Zool., iv, p. 360.

Head-plate generally longer than wide; frontal sulcus often present. No clypeal area. Labrum divided into one small, generally dentate or fringed median piece and two larger fringed lateral pieces, rarely more or less rudimentary. Body not remarkably narrowed in front, the head never particularly small, often relatively large. Mandible beset with a simple row of pectinate teeth. The telopodite of the first maxillae nearly always distinctly 2-jointed; in *Eriophilus* the basal joint of the telopodite is coalescent with the syncoxite. Lateral lobes present or wanting. The coxae of the second maxillae forming a syncoxite; the median suture persisting only in *Insigniporus*. The coxae are short and have no long edge. Terminal claw generally present, wanting in *Orinophilus* and *Geoperingueyia*. Maxillipedes with or without chitinous lines. The pleurocoxal suture runs obliquely to the side of the body; the maxillipedes generally do not project beyond the frontal margin, often remaining distant from it. Tergites generally bisulcate. Ventral pores present or wanting; if present, generally in one indefinite band in front of the posterior margin, rarely in one sharply circumscribed median area. Last legs generally 7-jointed, rarely 6- or 8-jointed; in the latter case (*Arenophilus*) the claw has been replaced by a bristly cylindrical joint. Terminal pores present or wanting.

Distribution.—Palearctic Region, North America, South America, Japan, New Zealand, East and West Africa, Juan Fernandez.

A great part of the genera demands re-examination, the diagnoses having been framed at a time when characters important to-day had not yet been considered.

Key to the Genera of Geophilinae.

- 1a. Tarsus of last legs 2-jointed 2.
- 2a. Last legs 8-jointed, the praetarsus being replaced by a little cylindrical bristly joint *Arenophilus* Chamb., *Nannocrix* Chamb.
- 2b. Last legs 7-jointed, with normal claw or without claw 3.
- 3a. Coxa of last legs with two groups of glands each opening by one large pore, without a strongly chitinated duct *Maoriella* Att.
- 3b. The coxal glands with a normal, relatively long, strongly chitinated duct opening by a pore 4.
- 4a. Sternites with tubercles or spines 5.
- 5a. Sternites with rounded tubercles, some of the anterior ones with a groove near the anterior margin as in *Geophilus carpophagus* *Chalandea* Bröl.
- 5b. Sternites with short pointed cones; without groove *Eurygeophilus* Verh.
- 4b. Sternites smooth, without tubercles or spines 6.
- 6a. The last two joints of the last legs abruptly thinner than the thick fifth joint 7.
- 7a. First joint of the telopodite of the first maxillae fused with the syncoxite. The two tarsal joints of last legs thin *Erithophilus* Ck.
- 7b. The first joint of the telopodite of the first maxillae not fused with the syncoxite. First tarsal joint of the last legs thicker than the second joint *Leptophilus* Chamb.
- 6b. The last joints of the last legs not abruptly thinner than the preceding joints. The first joint of the telopodite of the first maxillae not fused with the syncoxite, generally free, sometimes fused with the second joint 8.
- 8a. The median suture in the syncoxite of the second maxillae persistent 9.
- 8b. The coxae of the second maxillae completely fused, without median suture 10.
- 9a. Ventral pores in 1-2 circular areas. Claw of the second maxillae simple. The coxal pores of the last legs open into two grooves *Insigniporus* Att.
- 9b. No ventral pores. Claw of the second maxillae divided. The coxal pores of the last legs open singly over the whole surface *Pachymerellus* Chamb.
- 10a. Ventral pores wanting *Brachygeophilus* Bröl.
- 10b. Ventral pores present 11.
- 11a. Terminal claw of the second maxillae replaced by a sharp bristle *Orinophilus* Att.
- 11b. Second maxillae with normal terminal claws 12.
- 12a. Median piece of the labrum with short, strong teeth 13.
- 13a. The coxal pores of the last legs open in a groove near to the anterior corner of the sternite *Nesogeophilus* Verh.
- 13b. The coxal pores open singly and directly outwards 14.
- 14a. Maxillipedes with chitinous lines; intercalary sternites not divided. Tergites bisulcate. Telopodite of the first maxillae distinctly 2-jointed *Geophilus* s. str.
- 14b. Maxillipedes without chitinous lines; intercalary sternites divided in the median line 15.
- 15a. Tergites not sulcate. The telopodite of the first maxillae incompletely jointed *Purcellinus* nov. gen.

- 15*b*. Tergites bisulcate. Telopodite of the first maxillae distinctly 2-jointed
Mesogeophilus Verh.
- 12*b*. Median piece of the labrum fringed 16.
- 16*a*. Maxillipedes without chitinous lines. Claw of second maxillae pectinate
Geoporophilus Silv.
- 16*b*. Chitinous lines present. Claw of second maxillae simple 17.
- 17*a*. The coxal pores of the last legs open in 1 or 2 grooves . *Clinopodes* C. Koch.
- 17*b*. The coxal pores open singly 18.
- 18*a*. Lateral parts of labrum smooth, not fringed. Coxa of the last legs with only
 2-6 pores *Simophilus* Silv.
- 18*b*. Lateral parts of labrum fringed. Coxal pores numerous, dispersed on the
 whole surface *Pleurogeophilus* Verh.
- 1*b*. Tarsus of last legs 1-jointed 19.
- 19*a*. Claw of the second maxillae replaced by a bristle arising from a little knob.
 The telopodite of the first maxillae distinctly 2-jointed. (Last joint of
 last legs as long as the two preceding joints together. Tarsungulum of the
 maxillipedes with simple claw) *Geoperingueyia* nov. gen.
- 19*b*. Second maxillae with simple, normal claws; both joints of the telopodite of
 the first maxillae fused 20.
- 20*a*. Last joint of the last legs more than twice as long as the fifth. Tarsungulum
 of maxillipedes with simple claw. Sternites and tergites smooth
Apogeophilus Silv.
- 20*b*. Last joint of the last legs as long as the fifth. Tarsungulum of maxillipedes
 with two large teeth besides the terminal claw. Posterior sternites, tergites,
 and pleurites with little papillae *Dinogeophilus* Silv.

Gen. PURCELLINUS nov.

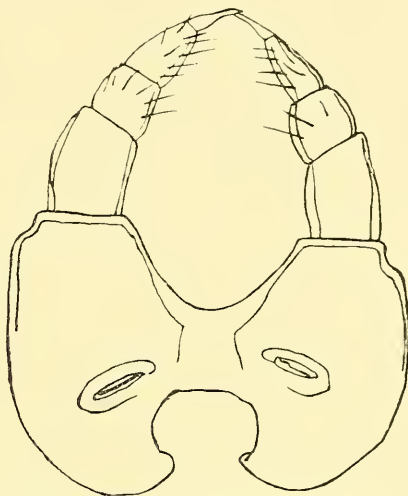
Head-plate longer than wide, no clypeal area. Antennae filiform. Labrum tripartite; the median piece strongly toothed, the lateral pieces long and fringed. Mandible with a single row of pectinate teeth. Syncoxite of the first maxillae without lateral lobes telopodite somewhat indistinctly 2-jointed, the basal joint with minute lateral lobe. Coxa of the second maxillae completely fused. The opening of the gland surrounded, except on the inner side, by a thickened rim without long chitinated edge. Coxae without lateral or median processes. Claw simple. Maxillipedes without chitinous lines, projecting beyond the frontal margin. Basal plate broad; sternite of the first pedal segment meeting the maxillipedes to a large extent. Tergites not sulcate. Intercalar sternites divided in the middle line. Ventral pores arranged in one transverse band in front of the posterior margin, interrupted in the middle. Last legs 7-jointed. Coxa with numerous pores opening freely and separately.

68. *Purcellinus robustus* n. sp.

(Pl. XIX, fig. 480; Pl. XX, figs. 483-486; text-fig. 52.)

The larger specimens of a dark yellow colour; small specimens pale yellow. The head-plate not much darker than the body. Length 26-28 mm., shape robust. ♂ and ♀ with 39-41 pairs of legs.

Head-plate (fig. 485) much longer than wide, punctate. No frontal sulcus. The first six antennal joints with two whorls of long bristles, the small hairs beginning on the first joint, antennae filiform, tapering. The whole clypeus with a polygonal reticulation. In the clypeal area of certain genera the meshes are a little smaller, but not paler in colour. Two long bristles near the frontal margin and two behind. The median piece of the labrum (fig. 480) separates the lateral pieces, and is tridentate, the teeth short, triangular. Lateral pieces fringed, the fringes relatively distant one from the other and with broad bases. Syncoxite of the first maxillae (fig. 483) without



TEXT-FIG. 52.—*Purcellinus robustus* Att.
Second maxillae.

lateral lobes, telopodite with short, finely-spined lateral lobe; coxal process and terminal joint with several long bristles. Coxae of the second maxillae completely fused, the interior angle not prominent (text-fig. 52). Coxae and femur of maxillipedes (fig. 484), with dispersed shallow punctation, no chitinous lines; anterior margin with two small brown teeth. Claw with one small basal tooth; the remaining joints not toothed. The maxillipedes extend beyond the frontal margin. A little broad basal plate half concealed by the head-plate. The maxillipedes are partially visible from above. The pleurocoxal suture runs obliquely to the lateral margin, reaching it approximately in the middle of the coxa. Only from the ventral side is a small part of the pleurae visible.

Tergites not sulcate. Intercalar tergites with one row of short hairs. Intercalar sternites divided, with one row of six hairs. Each

sternite with deep median longitudinal furrow and two bristles on each side. Ventral pores beginning on the first segment with a little rounded median area, further arranged in one narrow transverse band, at first indistinctly divided in the middle, then split up into two small portions.

Sternite of last legs (fig. 486) narrow, especially behind; coxa with numerous pores, leaving free the dorsal side and the posterior part of the ventral side. Terminal claw present. Last legs of the ♂ much incrassate, joints 1-5 ventrally densely pubescent, joint 6 less so, joint 7 sparsely pubescent. Last legs of the ♀ with a few long, scattered hairs. Terminal pores present.

Cape Province.—Table Mt. above Kirstenbosch (150163), Newlands Slope (7690), Platteklip Ravine (7683), Signal Hill (14647), Cape Flats, Princess Vlei (7703), Clanwilliam Div. (7572, 7578), Caledon (14650), Retreat, Cape Flats (7846).

Gen. *GEOPERINGUEYIA* nov.

Head-plate a little longer than wide; no clypeal area. Antennae filiform. Median piece of labrum rounded and prominent, smooth. The lateral pieces smooth, not fringed. The telopodite of the first maxillae 2-jointed. No lateral lobes. Syncoxite of the second maxillae without processes, the opening of the gland surrounded by a small ring open on the inner side. Telopodite 3-jointed, the terminal claw wanting. Maxillipedes without chitinous lines; the pleurocoxal suture running obliquely to the lateral margin. Telopodite 4-jointed. Tarsungulum with simple claw. The maxillipedes do not reach the frontal margin. Basal plate broad, extending to the sides of the body. Praebasal plate visible.

Tergites not sulcate. Intercalar sternites not divided. Ventral pores inconspicuous, arranged in one ill-defined transverse band near the posterior margin, and in a little area in front of the band. Last legs 6-jointed, much incrassate in the ♂. Coxa with numerous pores opening freely and separately. Last joint without claw in the ♂, with a claw in the ♀. Terminal pores present.

69. *Geoperingueyia conjungens* n. sp.

(Pl. XIX, figs. 472-476.)

Colour yellowish; head-plate chestnut. Length 53 mm. Broadest in the middle, tapering equally towards the front and rear. ♂ with

55, 61, or 67, ♀ with 69 pairs of legs. The difference of 12 pairs is relatively great, but in other species I have observed still greater variation.

Head-plate a little longer than wide, truncate in front, without frontal sulcus, with numerous and short hairs. Antennae filiform, the first joints with a few longer hairs arranged in whorls, the following joints with more numerous shorter hairs. Clypeus with equal polygonal reticulation and numerous long bristles, without clypeal area. Labrum (fig. 472) well developed, but not dentate and not fringed. The superior lamella consists of one small rounded median piece, the inferior lamella of two transverse oval lateral pieces. Both are smooth, and become connected in the neighbourhood of the median sinus. Mandibles typical; the same as in other *Geophilidae*. First maxillae without lateral lobes, the telopodite 2-jointed. Syncoxite of second maxillae (fig. 476) without any trace of a median suture. The opening of the gland surrounded on three sides by a thickened rim. Telopodite 3-jointed, with dispersed bristles; the second joint with one, the third joint with 4-5 longer ones; the terminal claw replaced by one long bristle arising from a little disc (fig. 475). The maxillipedes (fig. 474) do not reach the frontal margin. No chitinous lines, the anterior margin sinuate, without any teeth. Telopodite 4-jointed, joints 1-3 with one large inner tooth. Tarsungulum with a simple claw without basal tooth. Basal plate broad, extending to the sides of the body, with convergent margins. The praebasal plate visible.

Tergites not sulcate, the hairs numerous, but very fine and short. The anterior sternites are a little longer than wide, the posterior square, all hairless. The ventral pores are very small and are with difficulty visible. They are arranged in one ill-defined band in front of the posterior margin and in one small area near the anterior margin. The intercalar sternites are mesially divided from the first; the first sternite meets the maxillipedes throughout its whole width. Last legs (fig. 473) 6-jointed, in the ♂ much incrassate, almost club-like, with dense and short hairs, the last joint twice as long as the fifth; without claw. In the ♀ the last legs are slender and possess a terminal claw. Coxa with numerous dark brown pores on the under side and at the sides, each opening separately. Last sternite of the ♂ nearly quadrate, truncate behind, in the ♀ narrowed behind. Stigmata circular. Parascutellum very large, several times as large as the scutellum. Terminal pores present.

Krantzkop, Natal (B. 3387); Grahamstown, Cape.

2. Subfam. DIGNATHODONTINAE Ck.

1895. Fam. *Dignathodontidae* Cook, Arrangement of Geoph., p. 71.
 1909. Tribe *Heniini*, Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 326.
 1912. Subfam. *Linotaeminae* Chamberlin, Bull. Mus. Comp. Zool. Harvard, liv, p. 410.
 1914. Tribe *Dignathodontini* Attems, Indo-Austral. Myr., p. 126.
 1919. Fam. *Scolioplanidae* Verhoeff, Bronn's Class. u. Ordn., p. 519.
 1926. Subfam. *Dignathodontinae* Attems, Kükenthal's Handb. d. Zool., iv, p. 360.

Labrum divided into superior and inferior lamellae. The superior lamella consisting of one large median piece, larger than the lateral ones, dentate, the teeth directed towards the front. The inferior lamella divided into two lateral pieces not meeting in the median line, smooth and slender, not fringed, sometimes vanishing. Body much narrowed in front, the head very small. Ventral pores in one or two sharply circumscribed round areas, or wanting.

Genera: *Dignathodon* Mein., *Henia* C. Koch., *Scolioplanes* Mein., *Chaetechelyne* Mein., *Diplochora* Att. No representatives in South Africa.

3. Subfam. PACHYMERINAE Att.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 360.

Head-plate much longer than wide, frontal sulcus generally wanting. One, rarely two, clypeal areas present. The areas finely punctate or with fine polygonal reticulation. Labrum rudimentary in *Achilophilus*, where only the fulcra are present; in the other genera well developed, the median part smooth or with short teeth, the lateral pieces fringed or finely dentate. Mandible with a simple array of teeth; sometimes one strong single tooth as well.

First maxillae with syncoxite and 2-jointed telopodite, with or without lateral lobes. The coxae of the second maxillae are broadly and completely fused in *Pachymerinus*. In the other genera the median suture persists. The opening of the coxal gland is surrounded by a thickened rim, opening towards the median side. No long edge as in *Chilenophilinae*. The pleurocoxal suture of the maxillipedes runs parallel to the side. Chitinous lines are indistinct in *Pachymerium* and completely wanting in the remaining genera. Tergites generally bisulcate. Ventral pores present or wanting; when present, in one or two round areas or in one transverse band near the

posterior margin, and in two groups on the anterior half. Last legs generally 7-jointed, seldom 6-jointed, with or without claw. Terminal pores generally present.

Distribution.—South-west Africa, East Africa, Chile, Patagonia, Mexico, Florida, Guatemala, New Zealand, Palaearctic Region.

Key to the Genera of Pachymerinae.

- 1a. Labrum rudimentary, only the fulera present. Coxa of last legs with one large pore *Achilophilus* nov. gen.
- 1b. Labrum well developed. Coxa of last legs with several or numerous pores 2.
- 2a. Tarsus of last legs 1-jointed *Geomerinus* Bröl.
- 2b. Tarsus of last legs 2-jointed 3.
- 3a. Coxae of the second maxillae completely fused, no median suture . . . 4.
- 4a. Telopodite of first maxillae distinctly 2-jointed. Ventral pores present. Claw of second maxillae simple *Pachymerium* C. Koch.
- 4b. Telopodite of first maxillae undivided. No ventral pores. Claw of second maxillae pectinate *Tasmanophilus* Chamb.
- 3b. Coxae of second maxillae meeting by a broad bridge with persisting median suture or by a narrow bridge 5.
- 5a. Ventral pores present 6.
- 6a. Coxae of second maxillae connected by a narrow bridge. Clypeal area with polygonal reticulation *Schizotaenia* Ck.
- 6b. Coxae of second maxillae connected by a broad bridge. Clypeal area finely punctate *Eurytion* Att.
- 5b. No ventral pores 7.
- 7a. Mandible with a blunt tooth beside the pectinate teeth and with divided spines on the ventral margin *Pachymerinus* Silv.
- 7b. Mandible without the described tooth 8.
- 8a. First maxillae with one or two pairs of lateral lobes. Coxa of last legs with numerous pores opening singly on the dorsal and ventral side
Sepedonophilus Att.
- 8b. First maxillae without lateral lobes. Coxa of last legs with 3 lobate glands opening under the sternite *Philogeonus* Chamb.

Gen. ACHILOPHILUS nov.

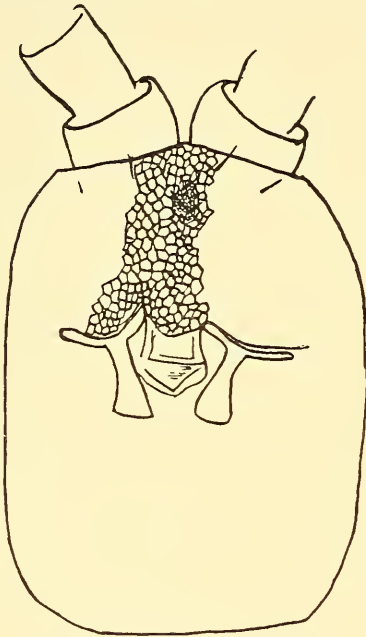
One clypeal area finely punctate. Labrum rudimentary, only the fulera present. Mandible with a simple fringe of comb-like teeth. Syncoxite of the first maxillae without lateral lobes, the inner coxal processes very short and broad. Telopodite distinctly 2-jointed, with smooth lateral lobes. Coxae of the second maxillae meeting in the median suture. Claw simple. Maxillipedes without chitinous lines. The pleurocoxal suture runs parallel to the sides, and does not extend completely to the anterior margin. The notch of the trochanter visible, femur and tibia free. Tergites bisulcate. Ventral pores

arranged in ill-defined areas. Intercalar sternites divided in the middle, first sternite meeting the maxillipedes fully. Last legs 7-jointed. Coxa with one large pore. Terminal claw present. No terminal pores.

70. *Achilophilus monoporus* n. sp.

(Pl. XX, fig. 482; text-figs. 53-57.)

Pale yellow, the head-plate a little or not at all darker. Length 38 mm., fairly broad; ♂ with 49-55, ♀ with 55 pairs of legs. Head-

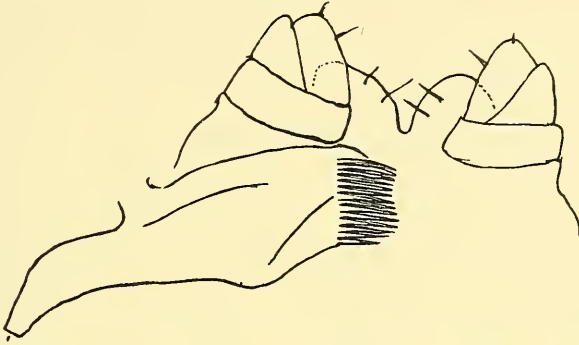


TEXT-FIG. 53.—*Achilophilus monoporus*
Att. Clypeus and labrum.

plate (text-fig. 57) longer than wide, the greatest width in the middle, with uniform polygonal reticulation. No frontal sulcus. Antennae filiform, tapering; the basal joints with two whorls of long bristles, and short hairs gradually increasing in number; the distal joints with short hairs only. Clypeus (text-fig. 53) with polygonal reticulation, the meshes large, the clypeal area round, finely punctate or granular, with some weak bristles; more bristles laterally. The inferior clypeal margin blunt, triangular, and supporting the large fulcrum, with a strong branch directed medially. The other parts of the labrum completely wanting. The coxae of the first maxillae (text-fig. 54) fused; the inner coxal processes

unusually short and broad, with some long bristles; without lateral lobes. Telopodite distinctly 2-jointed, the lateral lobe large, smooth (not spined), the base broad, tapering. Terminal joint with some long bristles. The median suture of the coxae of the second maxillae persisting. No lateral or inner coxal processes, the claw simple (text-fig. 55). The basal plate broad, extending to the sides of the body, the sides convex. From above only a small triangular piece of the maxillipedes is visible. The maxillipedes (text-fig. 56) do not reach the frontal margin. No chitinous lines and no inner teeth,

the hairs scattered. Tarsus in ♂ (two examples) with a little basal tooth, in ♀ (two examples) without basal tooth. The claw relatively small, the basal half with some small notches.



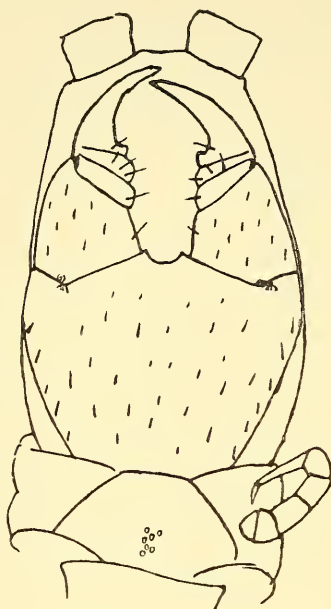
TEXT-FIG. 54.—*Achilophilus monoporus* Att. Mandible and first maxillae.



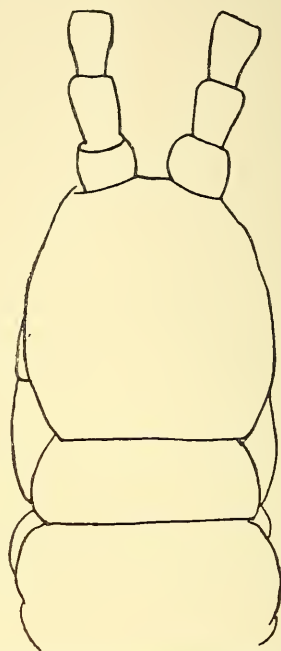
TEXT-FIG. 55.—*Achilophilus monoporus* Att. Maxillae.

Dorsum with polygonal reticulation; the meshes large. Tergites bisulcate, the hairs sparse. Ventral pores present on segments 1–19 or 20; on the first sternite they are present in one little median group, on the second in two ill-defined round areas, becoming gradually fewer to the twentieth segment, where they disappear. Inter-calar sternites divided. Last sternite (fig. 482) very broad, broader

than long, trapezoidal, the posterior margin short and pubescent. The inside of the coxa and the femur with the same pubescence. Coxa with one large round pore, opening under the margin of the sternite.



TEXT-FIG. 56.—*Achilophilus monoporus* Att. Maxillipedes.



TEXT-FIG. 57.—*Achilophilus monoporus* Att. Anterior end of ♀.

Terminal claw present. Last legs of the ♂ moderately incrassate. No terminal pores.

Cape Province.—Hanover (7768), Graaff Reinet (B. 800), Matjesfontein (13483).

Gen. GEOMERINUS Bröl.

1912. Brölemann, Rec. Austral. Mus., ix, p. 65.

Head-plate much longer than wide. One clypeal area present. Median piece of the labrum small, smooth, lateral pieces fringed. Mandible with one blunt, strongly chitinised tooth in addition to the fringe of comb-like teeth, and with spiny bristles in the ventral part. No lateral lobes to the syncoxite of the first maxillae, the telopodite 2-jointed, the basal joint with rudimentary lateral lobe. Median suture of second maxillae persisting; the inner process rudimentary.

No lateral teeth on the telopodite. Maxillipedes without chitinous lines. Pleurocoxal suture running parallel to the sides. No ventral pores. Last legs 6-jointed, with terminal claw. Coxa with numerous pores opening separately. Terminal pores present.

Distribution.—New South Wales.

One species, *G. curtipes* (Haase).

Gen. PACHYMERIUM C. Koch.

1903. Attems, Synop. d. Geoph., p. 248.

1907. Attems, Schultze's Forsch. Reise, p. 34.

1909. Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 338.

Head-plate much longer than wide. Frontal sulcus present or wanting. One or two finely punctate clypeal areas. The median piece of the labrum differing in size from the lateral pieces, with blunt teeth; the lateral pieces fringed. First maxillae with or without lateral lobes. Coxae of the second maxillae broadly coalescent. No median suture. No process on the inner angle. No teeth on the outside of the telopodite. The large maxillipedes are in great part visible from above and extend beyond the frontal margin. Chitinous lines indistinct or wanting. Pleurocoxal suture parallel to the sides of the body. Ventral pores present; arranged in one broad band sometimes interrupted in the middle, and generally also in two groups near the anterior angles. Last legs 7-jointed; terminal claw present. Coxa with numerous pores opening freely and separately.

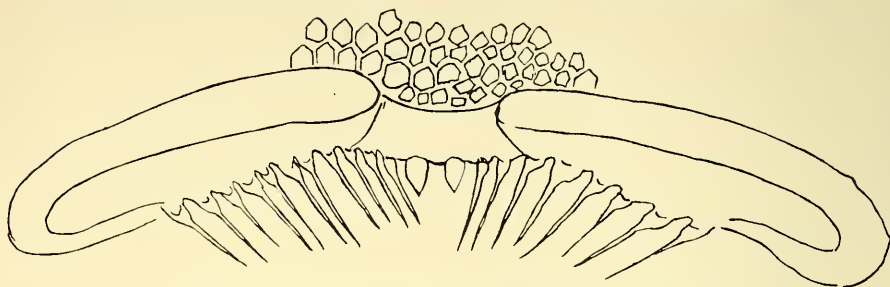
I doubt whether all the species from Europe, South Africa, South, Central, and North America at present ascribed to *Pachymerium* belong to this genus in its new and more restricted sense. A re-examination is desirable.

(70a) *Pachymerium tristanicum* n. sp.

(Pl. XX, figs. 489, 490; text-figs. 58–62.)

Colour pale yellow, the head-plate not much darker. Length 32 mm. Fifty-five pairs of legs (♀). Head-plate (text-fig. 62) longer than wide, with scattered long, fine hairs. No frontal sulcus. Antennae filiform; the first six joints with two whorls of long bristles, which disappear gradually from the seventh joint onwards. Clypeus polygonally reticulated. One whitish circular clypeal area with two long bristles. The remaining clypeal bristles inconspicuous. The

median piece of the labrum (text-fig. 58) incompletely separated from the lateral pieces; the median two-thirds of each lateral piece



TEXT-FIG. 58.—*Pachymerium tristanicum* Att. Labrum.

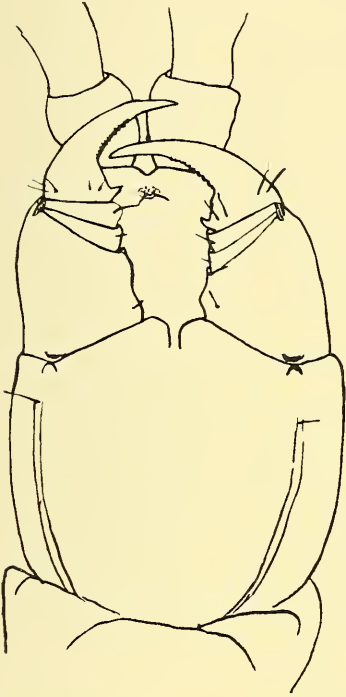
with long fringe. First maxillae (figs. 489, 490) with two pairs of lateral lobes; the lobes of the syncoxite are small, slender brushes.



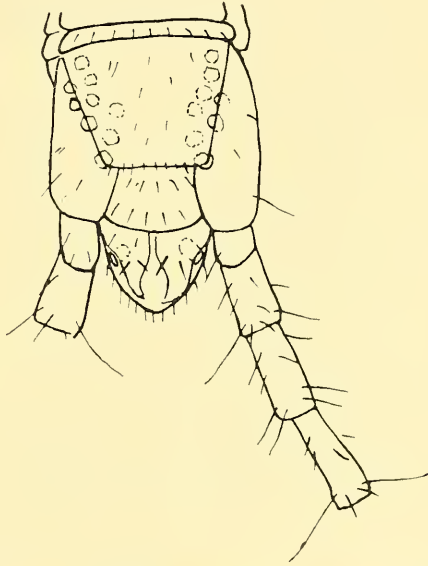
TEXT-FIG. 60.—*Pachymerium tristanicum* Att. Maxillae.

Telopodite incompletely 2-jointed, the suture indicated by a line in the form of steps in the lateral margin. Lateral lobe of the telopodite broad (fig. 490), finely pubescent. Coxal process and terminal joint with some long bristles. Coxae of the second maxillae (text-fig. 60)

completely fused. The openings of the coxal glands are transverse slits. The meshes of the polygonal reticulation are of different sizes. The telopodite without processes. Claw simple. Basal plate trapezoidal, nearly as wide behind as the first tergite, with one median longitudinal furrow. Maxillipedes (text-fig. 59) partly visible above, and extending beyond the frontal margin as far as the middle of



TEXT-FIG. 59.—*Pachymerium tristanicum* Att. Maxillipedes.

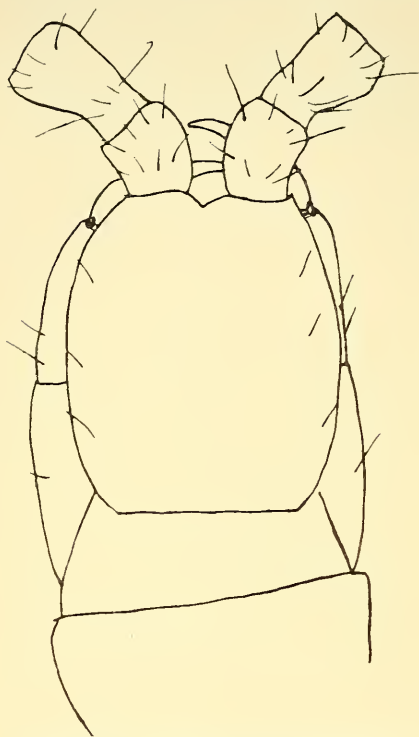


TEXT-FIG. 61.—*Pachymerium tristanicum* Att. Posterior end, ventral surface.

the first antennal joint. Tarsus with small basal tooth. The claw notched in the basal half. The remaining joints not toothed; the hairs scattered. Pleurocoxal suture running parallel to the sides until near to the condyle.

Tergites bisulcate; smooth, with dispersed short hairs. The intercalary sternites are visible as broad and triangular pieces on the first six segments; the first sternite meets the maxillipedes. Sternites with two bristles on each side; for the rest nearly hairless. Ventral pores arranged on the first sternite in one little rounded area; from

the second onwards in one broad band.



TEXT-FIG. 62.—*Pachymerium tristanicum*
Att. Anterior end, dorsal surface.

In the posterior segment they are apparently wanting (the only specimen was not macerated, and without maceration the pores are not always distinct). I saw no anterior groups of pores. Sternites of last legs (fig. 496) broad, slightly narrowed and truncate behind, with scattered hairs. Last legs 7-jointed, slender (♀), coxa with eight large pores, nearly concealed under the sternite (text-fig. 61). Terminal claw present. Terminal pores present.

Tristan d'Acunha (13707). I found the same species in a garden in Válaszut, Transylvania, Europe; a very remarkable distribution.

This species differs from the nearly allied species *P. ferrugineum*, *P. atticum*, and *P. caucasicum* in the absence of the teeth on the praefemur of the maxillipedes.

Gen. TASMANOPHILUS Chamb.

1920. Chamberlin, Bull. Mus. Harvard, lxiv, p. 44.
One species from Tasmania.

Gen. SCHIZOTAENIA Ck.

1895. Cook, Arrangement of Geoph., p. 73.

1896. Cook, Brandtia, viii, p. 25.

1905. Silvestri, Fauna Chilensis, Zool. Jahrb., vi, p. 761.

Head-plate narrow, much longer than wide; no frontal sulcus. One circular clypeal area with polygonal reticulation. Median piece of the labrum small, situated between the finely denticulate lateral pieces.

First maxillae without lateral lobes. Coxae of the second maxillae

connected by a narrow bridge, inner angle not prominent; tibia without lateral process. Maxillipedes without chitinous lines. Tergites not sulcate. Ventral pores inconspicuous, arranged in two transverse bands on the anterior half of the body. Last legs 7-jointed, terminal claw present. Coxa with numerous pores opening separately and freely. Terminal pores present.

Distribution.—East and West Africa, South America (Chile, Patagonia).

Gen. EURYTION Att.

1903. *Eurytion* Attems, Synop. d. Geoph., p. 244.

1905. *Eurytion* Silvestri, Fauna Chilens., p. 244.

1909. *Eurytion* subgen. *Plateurytion* Attems, Schultze's Forsch. Reise, p. 28.

Head-plate much longer than wide, frontal sulcus present or wanting. One finely punctate clypeal area. Median piece of the labrum small, smooth, or with little blunt tubercular teeth, or fringed; lateral pieces fringed. First maxillae with or without lateral lobes. Coxae of the second maxillae connected by a broad bridge, the median suture persisting. Inner angle not prominent. Maxillipedes without chitinous lines. Praefemur with or without inner teeth. The pleuro-coxal suture runs parallel to the sides. Basal plate generally narrow, rarely broad. Tergites bisulcate. Ventral pores arranged in one or two rounded areas. Last legs 7-jointed; coxa with numerous pores opening singly on the dorsal and ventral sides or combined into groups; sometimes wanting. Terminal claw present. Last sternite generally broad, rarely (*trichopus*) narrow. Terminal pores present or wanting.

Distribution.—South Africa, Chile.

Key to the Species of *Eurytion*.

- 1a. The anterior segments with one circular porose area, the following segments with two areas or none 2.
- 2a. Last legs without coxal pores *aporopus* Att.
- 2b. Coxal pores on last legs present 3.
- 3a. Syncoxite of the first maxillae without lateral lobes 4.
- 4a. No frontal sulcus. Praefemur of maxillipedes without teeth or with one minute tooth. South African species 5.
- 5a. Praefemur of maxillipedes without teeth. 81-89 pairs of legs *badiceps* Att.
- 5b. Praefemur of maxillipedes generally with one small tooth near the end. 61-75 pairs of legs 6.
- 6a. Porose area of anterior sternites circular; from the twentieth segment it is divided into two areas. Sternite of last legs rounded; 61 pairs of legs *kalaharinus* Att.

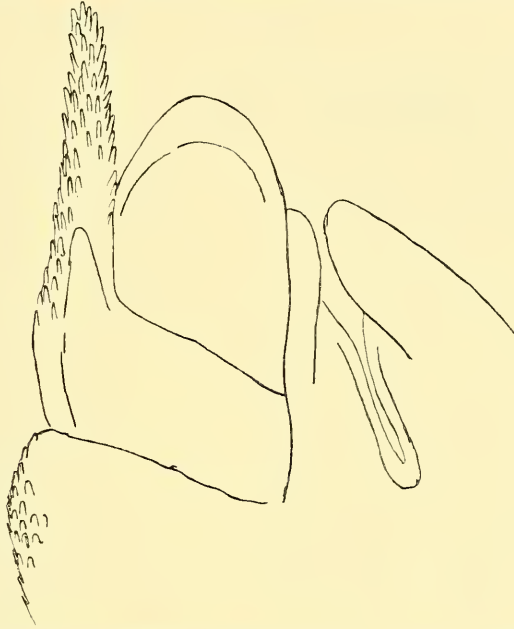
- 6b. Porose area of anterior sternites oval; from the twenty-sixth segment it is divided into two areas. Last sternite truncate and narrowed behind.
71-75 pairs of legs *dolichocephalus* n. sp.
- 4b. Frontal sulcus present. Praefemur of maxillipedes with two large teeth.
South American species 7.
- 7a. 49 pairs of legs; only the anterior sternites with a porose area. Sulci of the tergites very shallow *metopias* Att.
- 7b. 63-73 pairs of legs; the anterior segments with one, the following segments with two porose areas. Sulci of the tergites deep 8.
- 8a. Pores of the last coxae distributed over the ventral, lateral, and dorsal sides. Terminal pores present *michaelsenii* Att.
- 8b. The few pores of the last coxae opening under the sternite. No terminal pores *moderatus* Att.
- 3b. Syncoxite of the first maxillae with lateral lobes (South Africa) 9.
- 9a. Median piece of the labrum with little tubercular teeth; the pores of the last coxa concealed under the sternite. Praefemur of maxillipedes with two large teeth. Last sternite very broad. ♂ with 69 pairs of legs . . . *sabulosus* Att.
- 9b. Median piece of the labrum with long fringes. The pores of the last coxa open under the sternite, on the free surface, and along the dorsal margin . . . 10.
- 10a. Praefemur of maxillipedes with two large teeth. Porose area circular to the twentieth segment. Sternite of last legs very broad. ♂ with 73-75(79), ♀ with (75)77-81 pairs of legs *dentatus* Att.
- 10b. Praefemur of maxillipedes not toothed or with one very small tooth. Porose area of segments 1-24 arcuate in front and irregular behind, pointed laterally; from the twenty-fifth divided into two areas. Last sternite narrow, much narrowed posteriorly. ♂ with 65-69 pairs of legs . . . *trichopus* n. sp.
- 1b. All young specimens without ventral pores; older specimens sometimes with some small scattered pores on the anterior sternites 11.
- 11a. Praefemur of the maxillipedes with two strong teeth. Ungulum smooth. The coxal pores of the last legs scattered over the whole surface. The first joint of the telopodite of the second maxillae parallel-sided; the claw as long as the second joint. 51 pairs of legs . . . *incisunguis* Att.
- 11b. Praefemur of the maxillipedes with one tooth 12.
- 12a. Ungulum smooth. Coxal pores of the last legs only on the ventral side. Median piece of labrum with 2 or 3 teeth. The claw of the second maxillae nearly as long as the second joint of the telopodite. 37-39 pairs of legs
mjöbergi Verh.
- 12b. Ungulum crenellated. The coxal pores of the last legs distributed on the whole surface. Median piece of labrum not dentate. Claw of the second maxillae at most half as long as the second joint. 53-55 pairs of legs.
attemsi Verh.

71. *Eurytion dolichocephalus* n. sp.

(Pl. XIX, fig. 471; Pl. XX, fig. 491; text-figs. 63-65.)

Colour pale yellow, the head-plate only a little darkened. Length 52 mm., slender. ♂ with 71(73), ♀ with 73-75 pairs of legs. Head-plate one and a half times as long as wide; the broadest part

near the posterior margin, with numerous punctuations and hairs; no frontal sulcus. The reticulation of the clypeus regular, the meshes hexagonal and large; one longitudinal oval clypeal area, finely granular, with two long bristles. Antennae filiform, tapering. The labrum (fig. 471) shows very distinctly the two lamellae described by Verhoeff; the superior lamella consists of two broad strips, not meeting, but separated by a little space and beset with a few fringes.

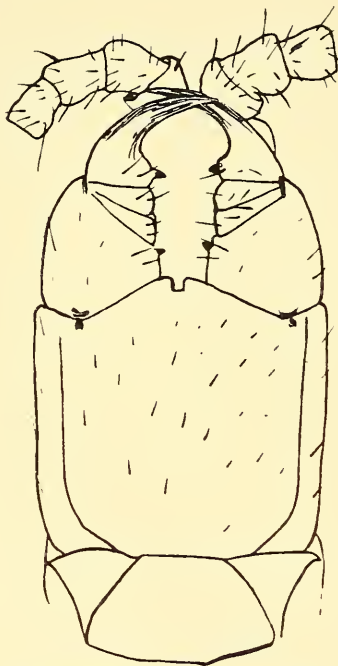


TEXT-FIG. 63.—*Eurytion dolichocephalus* Att. First maxillae.

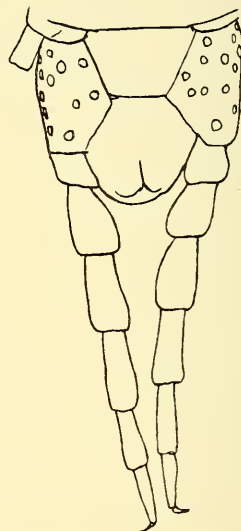
Each passes over laterally into the inferior lamella. This lamella is not distinctly divided; the middle part is a little prominent and rounded, and beset with shorter bristles. In *badiceps* the labrum is similar, but the lateral pieces of the superior lamella are not fringed at all, and the median piece of the inferior lamella is more detached. The sides of the syncoxite of the first maxillae are covered with little scales, but without lateral lobes. Basal joint of the telopodite with long-spined lateral lobes projecting beyond the distal joint (text-fig. 63). The median suture of the coxae of the second maxillae distinct; all joints without processes. Claw simple (fig. 491). Basal plate trapezoidal, nearly as long as the first tergite and narrower. The maxillipedes are finely punctate and pubescent, and pass beyond

the frontal margin up to the middle of the first antennal joint. Anterior margin of the coxae notched, with two small black teeth; tarsus with a small black basal tooth (text-fig. 64).

Ventral pores of segments 2-25 arranged in one oval transverse area; from the twenty-sixth segment the area is divided into two parts, which gradually become smaller and further apart. Sternites with one sharp median furrow; on the anterior segments one single



TEXT-FIG. 64.—*Eurytion dolichocephalus* Att. Maxillipedes.



TEXT-FIG. 65.—*Eurytion dolichocephalus* Att. Posterior end, ventral view.

porose area, the furrow running in front of this. The anterior sternites meet, and the intercalar sternites are visible only as small triangular pieces. In the posterior part of the body the intercalar sternites are large and not divided. Tergites bisulcate. Last sternite very large, trapezoidal, truncate behind; the tergite very large, the basal joints of the last legs consequently nearly invisible from above. Coxa with numerous pores opening freely on the ventral side (text-fig. 65). Terminal pores wanting.

Hanover (7768), De Aar (B. 814), Cape.

72. *Eurytion trichopus* n. sp.

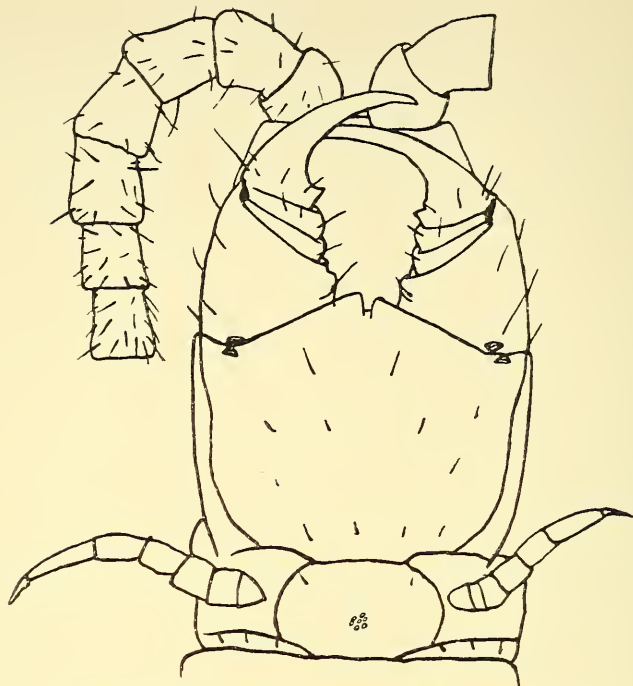
(Pl. XIX, figs. 477, 478 ; Pl. XX, figs. 487, 488 ; text-figs. 66, 67.)

Colour brownish-yellow, the head-plate and the maxillipedes only a little darker. Length 65 mm. ♂ with 65–69(77),* ♀ with (67) 69–79 pairs of legs. Head-plate longer than wide, punctate, with scattered long hairs. The two episcutal sulci just visible, extending from the posterior margin to the middle. No frontal sulcus. The first six antennal joints with two whorls of long bristles ; from the fifth joint the short hairs are intermixed. Clypeus with regular polygonal reticulation. Clypeal area oval, finely punctate, with three long bristles. In front and on each side of the area two bristles. Median and lateral pieces of the labrum with long fringes. First maxillae (fig. 478) with two pairs of lateral lobes ; the lobes of the syncoxite short, triangular, finely spined ; the lobes of the telopodite longer and more slender, also spined. Telopodite distinctly 2-jointed. The coxal process and the terminal joint with some long bristles. Median suture of the coxae of the second maxillae (fig. 477) very distinct ; inner angle not prominent, the telopodite densely pubescent, claw simple. No thickening alongside the opening of the coxal gland.

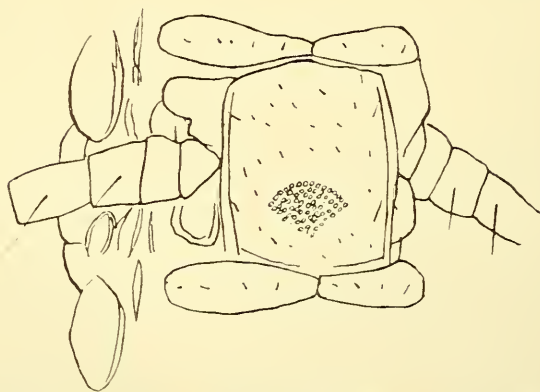
Basal plate broad but short, not sulcate. Maxillipedes (text-fig. 66) punctate and pubescent. The pleurocoxal suture extending to the anterior margin, bent a little outwards distally. Anterior margin of the coxa with two short black teeth ; trochanter notch distinct. Trochantero-praefemur with or without one small tooth. Basal tooth of the tarsus very small. Claw smooth. The first sternite meets the maxillipedes. Tergites with two deep episcutal sulci, punctate. The first sternite with some pores ; from the second sternite onwards, one large, rounded, or oval porose area limited in front by a regular arcuate furrow, and not extending to the middle (text-fig. 67). On the twenty-fifth segment the area begins to be divided into two small oval areas ; present even on the penultimate pedal segment. A short, deep longitudinal furrow present. The whole surface finely and sparsely pubescent. The intercalary sternites are divided, each half with three bristles. No porose areas near the anterior angles.

Last sternite much narrowed behind ; the coxa with numerous

* The numbers in parentheses are the numbers resulting from the observation of the opposite sex, but not observed in the sex in question. If a female has 79 pairs there must be males with 77 pairs.



TEXT-FIG. 66.—*Eurytion trichopus* Att. Maxillipedes.



TEXT-FIG. 67.—*Eurytion trichopus* Att. Sixth segment of ♂, ventral view.

large pores. In the ♂ the posterior quarter of the sternite, the inside of the coxa, and the ventral side of joints 2-6 of the last legs densely

pubescent. The last legs of the ♂ are moderately incrassate (fig. 487). Terminal pores present.

Cape Province.—Table Mt., Newlands Slope (7688); Platteklip Ravine (7689), above Klastenbosch (150163), Cape Peninsula (1512).

73. *Eurytion aporopus* Att.

1922. Attems, Beitr. Kennr. Land Süßsw. Fauna, S.W. Afr., Bd. 2, Lf. 1, p. 99, fig. 1.

Colour pale yellow, the head very little darker. Length 50 mm. ♂ with 57–59, ♀ 59–61 pairs of legs. Head much longer than wide, the sides parallel and connected by broad arches with the anterior and posterior margin. Anterior margin lobate. No frontal sulcus. The whole head-plate polygonally reticulated. The first antennal joints (ca. 6) with two whorls of long bristles, intermixed with short hairs. One circular, finely punctate clypeal area with two long bristles; some bristles near the clypeal area. Median piece of the labrum rudimentary, situated behind the lateral pieces, and smooth, not dentate or fringed. The lateral pieces have some weak teeth in the median half. Syncoxite of the first maxillae without palps. First joint of the telopodite with one long palp, longer than the whole telopodite, slender, conical, and covered with little soft scales. Last joint with some long bristles. Median suture of the coxa of the second maxillae distinct; inner angle of the coxa not prominent. Second and third joints of the telopodite with some long bristles; for the rest the telopodite is hairless. Claw simple. The maxillipedes surpass the frontal margin and the first antennal joint; the coxae are punctate, the anterior margin not dentate; the trochanter notch distinct. Praefemur not dentate. Tarsus with one minute basal tooth. Ungulum smooth. Basal plate relatively narrow.

Tergites bisulcate, sparsely pubescent, similar to the whole body. First sternite broadly meeting the coxae of the maxillipedes, non-porose. Sternites 2–19 with circular porose area; the area is divided into two from the twentieth to the penultimate pedal segment. The sternites to the twentieth with polygonal reticulation, the meshes large. The intercalary sternites are divided in the median line and are visible as broad triangular pieces in the anterior half of the body. Sternite of the last legs broad, rounded behind. Last legs 7-jointed. The coxae non-porose; this character distinguishes this species from all others in the genus; joints 1–5 with large glandular masses; moderately incrassate. Terminal claw present. Terminal pores wanting.

Damaraland.—Farm Voigtland, Bismarkbergen, 38 km. east of Windhoek; Okahandja (Michaelsen Coll.).

74. *Eurytion badiceps* Att.

1909. Attems, Schultze's Forsch. Reise, p. 32.

Caledon (14650), Cape.

Little Namaqualand.—Kamaggas, Steinkopf (Schultze).

75. *Eurytion dentatus* Att.

1909. Attems, Schultze's Forsch. Reise, p. 31.

Cape Province.—Cape Peninsula (1512), near Cape Town (A. 23348), Devil's Peak (7668, 13507), Signal Hill (150108, 7666), Table Mt., Newlands Slope (7696, 150107, 7684), Platteklip Ravine (7674), Bergvliet (13760), St. James (150101, 7707), Gordon's Bay (A. 23397), Caledon Div., Steenbrass River (A. 2335), Pass at Avontuur, near Stormsvlei, Swellendam (7335), Sir Lowrie's Pass (7304), Onderberg vlei, Piquetberg (7429), Ashton (B. 827), Kimberley (34055).

76. *Eurytion sabulosus* Att.

1909. Attems, Schultze's Forsch. Reise, p. 33.

Kogman's Kloof, near Ashton, Robertson Div. (1680); Kamaggas, Little Namaqualand.

77. *Eurytion kalaharinus* Att.

1909. Attems, Schultze's Forsch. Reise, p. 20.

Kalahari (Schultze), Okahandja (Michaelsen).

The species *E. metopias* (Att.), *michaelseni* (Att.), and *moderatus* (Att.) live in Chile. Perhaps *Geophilus porsus*, Porat (Cameroon), and *Geophilus concolor*, Gervais-Haase (Australia), belong to this genus.

Gen. SEPEDONOPHILUS Att.

1909. Attems, Schultze's Forsch. Reise, p. 34.

Head-plate much longer than wide; no frontal sulcus. One polygonally reticulated clypeal area. First maxillae with two pairs of lateral lobes. Telopodite 2-jointed. Median suture of second maxillae persisting. Inner coxal angle prominent. Maxillipedes without chitinous lines; praefemur with two teeth; the pleurocoxal suture running parallel to the side of the body. No ventral pores.

Last legs 7-jointed; coxa with numerous single and freely opening pores. Last sternite moderately broad. Terminal pores present.

Distribution.—Australia (one species).

Gen. *PACHYMERINUS* Silv.

1905. Silvestri, *Fauna Chilensis*, p. 155.

1907. Silvestri, *Mitt. Nat. Mus. Hamb.*, xxiv, p. 252.

1912. Brölemann, *Rec. Austral. Mus.*, ix, p. 60.

One clypeal area present (its structure not known). Median piece of the labrum small, not dentate, the lateral pieces fringed. Mandible sometimes with one blunt tooth in addition to the fringe of comb-like teeth, and with spiny bristles on the ventral margin. First maxillae with or without lateral lobes. The median suture of the second maxillae persisting; inner coxal angle prominent. Telopodite without lateral teeth (chitinous lines?). Pleurocoxal suture parallel to the sides. Praefemur with one large tooth. No ventral pores. Posterior margin of the sternite of some of the anterior segments a little prominent in the middle. Last legs 7-jointed. Coxa with single and freely opening pores on the dorsal and ventral sides. Claw present. Terminal pores present.

Distribution.—Chile (four species); N.S. Wales, Australia (one species).

Gen. *PHILOGEONUS* Chamb.

1920. Chamberlin, *Bull. Mus. Harvard*, lxiv, p. 48.

One species in New Zealand.

4. Subfam. *CHILENOPHILINAE* Att.

1909. Subfam. *Chilenophilinae* Attems, Schultze's *Forsch. Reise*, p. 22.

1909. Tribe *Ribautiinae* Brölemann, *Arch. Zool. Exp. Gen.*, (5), iii, p. 327.

1910. Tribe *Ribautiinae* Ribaut, *Bull. Soc. Hist. Nat. Toulouse*, xliii, p. 124.

1912. Subfam. *Chilenophilinae* Chamberlin, *Bull. Mus. Comp. Zool. Harvard Coll.*, xxiv, p. 410.

1914. Subfam. *Chilenophilinae* Attems, *Indo.-Austral. Myr.*, p. 128.

1926. Subfam. *Chilenophilinae* Attems, *Kükenthal's Handb. d. Zool.*, iv, p. 360.

One or two clypeal areas present (*Proschizotaenia* and *Watophilus* have not been examined respecting this character). Maxillipedes

generally without chitinous lines and the pleurocoxal suture running parallel to the sides. In *Ribautia* and *Schizoribautia* chitinous lines are present and the pleurocoxal suture is oblique. The coxae of the second maxillae are broadly coalescent only in *Arctogeophilus*, while they are connected by a narrow bridge in the other genera, or if connected by a broad bridge the median suture persists. Coxa with a long edge of yellow thickened chitin, in strong contrast with the surrounding thin and whitish chitin.

Head-plate longer than wide. The maxillipedes partially visible from above and projecting beyond the frontal margin. The frontal sulcus generally wanting; present in *Gnathoribautia*. Median piece of the labrum generally well developed, smooth or dentate, rarely indistinct. Lateral pieces with long fringes. First maxillae with or without lateral lobes; the telopodite distinctly 2-jointed, rarely indistinctly jointed (*Alloschizotaenia*). Tergites bisulcate or smooth. Ventral pores present or wanting; if present arranged in various ways: in one or two rounded areas, or in one transverse band and two areas in front of it, etc. Last legs generally 7-jointed; rarely 8-jointed, the claw being replaced by a short joint. Terminal pores present or wanting.

Distribution.—South America, Brazil, Columbia, Chile, Patagonia, North America, Australia, East and South Africa, Palaearctic Region.

Key to the Genera of *Chilenophilinae*.

- 1a. Praetarsus of last legs claw-like or wanting 2.
- 2a. The coxae of the second maxillae completely coalescent along a large part of their inner margins 3.
- 3a. Median piece of labrum indistinct, situated behind the fringed lateral pieces. No ventral pores *Arctogeophilus* Att.
- 3b. Median piece of labrum large, strongly dentate, separating the lateral pieces. Ventral pores present in four areas *Nesidiphilus* Chamb.,
Suturodes Chamb.
- 2b. Coxae of second maxillae connected by a small bridge 4.
- 4a. Maxillipedes with chitinous lines *Ribautia* Bröl.
- 4b. Maxillipedes without chitinous lines 5.
- 5a. Median piece of labrum small, not dentate, situated behind the lateral pieces which meet in front of it 6.
- 6a. Ventral pores present. Anterior sternites with a tongue-shaped process on the posterior margin *Chilenophilus* Att.
- 6b. No ventral pores. Sternites without such a lobe *Queenslandophilus* Verh.
- 5b. Median piece of the labrum generally dentate, situated between the lateral pieces, separating them. Sternites without prominences on the posterior margin 7.

- 7a. Ventral pores present 8.
- 8a. Second maxillae with prominences on the medial corner of the coxa and on the lateral margin of the tibia. Coxa of last legs with hairy, round prominence. Ventral pores arranged in a transverse band and two areas or in four areas
Polygonarea Att.
- 8b. Second maxillae without these prominences. Coxa of last legs without hairy prominence. Ventral pores arranged in a narrow band *Lestophilus* Chamb.
- 7b. No ventral pores 9.
- 9a. One clypeal area, no frontal sulcus. Last legs with claw *Brachygonarea* Rib.
- 9b. Two clypeal areas, frontal sulcus present, last legs without claw
Gnathoribautia Bröl.
- 1b. The praetarsus of the last legs is a small, pubescent joint, the legs therefore 8-jointed 10.
- 10a. Ventral pores present 11.
- 11a. Ventral pores arranged in one rounded area. Coxae of second maxillae not coalescent. First maxillae without lobes . . . *Proschizotaenia* Silv.
- 11b. Ventral pores arranged in six areas. Coxae of second maxillae connected by a broad bridge. First maxillae with two pairs of lobes *Telocricus* Chamb.
- 10b. Ventral pores wanting 12.
- 12a. The coxal pores of the last legs open in two large grooves. Lateral corner of the first and second joint of the telopodite of the second maxillae dentiform *Schizonampa* Chamb.
- 12b. The coxal pores open singly. Second joint of the telopodite of the second maxillae not dentate 13.
- 13a. First maxillae with two pairs of long lateral lobes. Terminal pores present. Femur of the second maxillae with inner and outer processes
Watophilus Chamb.
- 13b. First maxillae with minute lateral lobes on the telopodite. Syncoxite without lobes. Terminal pores wanting. Telopodite of the second maxillae without processes *Alloschizotaenia* Ck.

Gen. ARCTOGEOPHILUS Att.

1909. *Geophilus*, subgen. *Arctogeophilus* Attems, Myr. Vega. Exp. Ark. Zool., v, p. 23.

1910. Gen. *Arctogeophilus* Ribaut, Bull. Soc. Hist. Nat. Toulouse, xliii, p. 125.

1910. Gen. *Gnathomerium* Ribaut, *ibid.*, p. 106.

No frontal sulcus. Superior lamella of the labrum consisting of one fringed piece. The median piece indistinctly developed; the lateral pieces meeting. The clypeal area marked by the smaller size of the meshes, but not sharply defined. The surrounding area polygonally reticulated with larger meshes. The first maxillae with two pairs of large lateral lobes; the telopodite distinctly 2-jointed. Coxae of the second maxillae coalescent; the edge near the gland-opening long. Telopodite normal, 3-jointed, with simple terminal claw. Maxillipedes

without chitinous lines. The pleurocoxal suture runs parallel to the sides up to the distal margin. Basal plate broad. No ventral pores. Last legs 7-jointed, without claw; coxa with single and freely opening pores on the ventral side. Terminal pores present.

Distribution.—Arctic Regions, North Carolina, France, Germany.

Four species: *A. glacialis* Att., *americanus* Rib., *wolffi* Rib., *inopinatum* Rib.

Gen. NESIDIPHILUS Chamb.

1915. Chamberlin, Bull. Mus. Harvard, lix, p. 511.

Distribution.—Cuba, Jamaica, Haiti, Nicaragua.

Species: *N. latus* Chamb., *montis* Chamb., *juvenis* Chamb., *nicaraguae* Chamb.

Gen. SUTURODES Chamb.

1922. Chamberlin, Proc. U.S. N. Mus., lx, p. 13.

Distribution.—Guatemala, Honduras.

Species: *S. guatemalae* Chamb., *tardus* Chamb.

Gen. RIBAUTIA Bröl.

1909. Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 335.

1910. Ribaut, Bull. Soc. Hist. Nat. Toulouse, xliii, p. 126.

1912. Ribaut, Chilop. d. Colombia, p. 84.

1912. *Schizoribautia* Brölemann, Rec. Austral. Mus., ix, p. 70.

Head-plate much longer than wide; no frontal sulcus. One clypeal area. The median piece of the labrum with tubercular teeth, separating the lateral pieces. The median ends of the lateral pieces partially overlapping the median piece; lateral pieces fringed. First maxillae without lateral lobes. Claw simple. The coxae of the second maxillae connected by a bridge only, not coalescent. The edge near the gland-opening long, the inner angle prominent. Tibia with or without lateral teeth. The chitinous lines abbreviated; the pleurocoxal suture running obliquely to the lateral margin.

Tergites bisulcate. Ventral pores present; first sternite with or without pores. Generally the pores are arranged in one unpaired area on the anterior and posterior segments, and in two areas next to each other, sometimes also in two on the posterior segments. Sternites without median lobe on the posterior margin. Last legs 7-jointed, generally with claw. The coxal pores open singly or are combined into groups at the bottom of cavities. The end of the coxae

densely covered with hairs and more or less rounded and prominent. Terminal pores wanting or present.

Distribution.—S.W. Australia, New Zealand, New Caledonia, Loyalty Is., Columbia, Brazil, Peru.

Species : *R. aggregata* Bröl., *bouvieri* Bröl., *brittini* Arch., *centralis* Silv., *coarctata* Rib., *conifera* Att., *derrana* Chamb., *dietrichiae* Verh., *fuhrmanni* Rib., *gracilis* Rib., *imparata* Att., *mjöbergi* Verh., *porosa* Verh., *rainbowi* Bröl., *repanda* Att., *sarasini* Rib., *seydi* Rib., *taeniata* Rib., *wheeleri* Chamb.

Gen. CHILENOPHILUS Att.

1909. Attems, Schultze's Forsch. Reise, p. 27.

Head-plate much longer than wide, no frontal sulcus ; one finely punctate clypeal area. Median piece of the labrum very small, smooth, situated behind the lateral pieces ; the latter nearly meeting, and fringed. Lateral lobe of the coxae of the first maxillae rudimentary, telopodite with well-developed lateral lobe. Coxae of the second maxillae connected only by a small bridge ; thickened edge long. Inner angle not prominent. No chitinous lines ; the pleuro-coxal suture parallel to the sides. Basal plate broad. Tergites bisulcate. The anterior sternites with a rounded lobe in the middle of the posterior margin. Ventral pores arranged in one transverse band interrupted in the middle, and in two rounded areas in front of the band. Last legs 7-jointed ; coxa with numerous freely opening dorsal and ventral pores ; terminal claw present.

Distribution.—Chile.

One species : *C. corralinus* Att.

Gen. QUEENSLANDOPHILUS Verh.

1925. *Arctogeophilus*, subgen. *Queenslandophilus* Verhoeff, Ark. f. Zool., xvii, p. 49.

Distribution.—Queensland, Japan.

Two species : *Q. sjöstedti* Verh., *viridicans* Att.

Gen. POLYGONAREA Att.

1909. Attems, Schultze's Forsch. Reise, p. 24.

Head-plate much longer than wide, no frontal sulcus ; one clypeal area with fine polygonal reticulation. Median piece of the labrum large, smooth, or dentate, situated between the fringed lateral pieces.

First maxillae with two pairs of long lateral lobes. Coxae of the second maxillae connected by a small bridge; inner angle prominent and tuberculate; tibia with lateral tooth. Maxillipedes without chitinous lines; pleurocoxal suture parallel to the sides. The maxillipedes are largely visible from above and project beyond the frontal margin. Basal plate broad. Tergites bisulcate. Ventral pores arranged in one transverse band, divided sometimes into two areas next to each other, and into two round groups in front of the transverse band. Sternites without lobe on the posterior margin. Last legs 7-jointed, with terminal claw, coxa with an oval prominence bearing short hairs on the median side of the dorsal surface; a few pores opening singly, freely, or under the margin of the sternite. Sternite broad, narrowed behind. Terminal pores present.

Distribution.—Cape.

The extent of this genus was reduced by Ribaut, who put one species (*apora*) in the new genus *Brachygonarea*, and several species in the new genus *Ribautia*; hence only two species already described and one new species remain in this genus.

Key to the Species of Polygonarea.

- 1a. Median piece of the labrum smooth; first sternite with two groups of pores; terminal pores present. 61–65 pairs of legs *kraepelini* Silv.
- 1b. Median piece of the labrum dentate; first sternite without pores; terminal pores wanting. 55–59 pairs of legs 2.
- 2a. The first six antennal joints with two whorls of long bristles; ventral pores arranged from the second to the penultimate sternite in one broad transverse band interrupted in the middle by a small non-porose space, and in two anterior rounded groups *oligopus* Att.
- 2b. Joints 3–6 of the antenna with one single basal whorl of long bristles. The ventral pores arranged on segments 2–18 and on the last 10 segments in one median rounded or angular area; on the intermediate segments in two areas next to each other; on all segments from the second to the penultimate there are two rounded groups in the anterior part of the sternite as well
monospathis n. sp.

78. *Polygonarea kraepelini* (Silv.).

1907. *Eurytion kraepelini* Silvestri, Jahrb. Hamb. Wiss. Anst., xxiv, p. 254.

1909. *Polygonarea kraepelini* Attems, Schultze's Forsch. Reise, p. 25.

1912. *Polygonarea kraepelini* Ribaut, Chilop. d. Colombia, p. 85.

Cape Province.—Port Elizabeth (Silv.). *Gt. Namaqualand*.—Kuibis (Michaelsen).

79. *Polygonarea oligopus* Att.

1909. Attems, Schultze's Forsch. Reise, p. 26.

(Pl. XX, fig. 481.)

The number of legs varies in the ♂ from 47 to 61 pairs; most of the specimens in the collection of the Museum have 51, some 53, and one has 61 pairs; the ♀♀ examined all have 53 pairs. The specimens first described had 55 (♂) to 59 (♀) pairs.

As a supplement to my first description I note that the coxa of the last leg bears at the end a rounded oval excrescence densely covered with short hair. It seems to be filled with glandular tissue and it is probably characteristic of the genus (fig. 481).

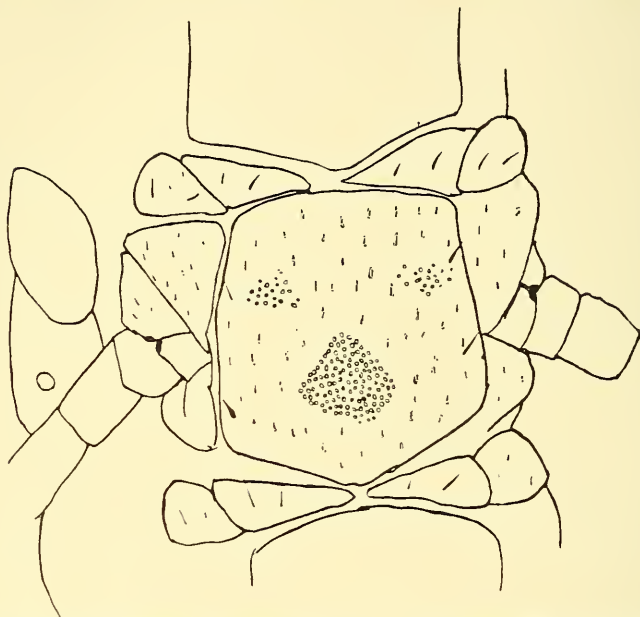
Cape Province.—Cape Peninsula (23354), near Cape Town (A. 27348), Hout Bay (7741), Mossel Bay (1618), Cape Flats (7704), Kalk Bay (7651), Table Mt., Newlands Slope (7696), St. James (150101), Bergvliet (13760), Touws River (13484, 1604), Port Elizabeth (7400), Simonstown Waterfall (7725), Grahamstown (B. 820), Kei Road (B. 928), Top of Table Mt. (B. 2250), Muizenberg (13508). *Little Namaqualand*.—Kamaggas (Schultze). *Natal*.—Port Shepstone (150187), Howick (150171). *Portuguese E. Africa*.—Masiene (5999).

80. *Polygonarea monospathis* n. sp.

(Pl. XIX, fig. 470; Pl. XX, figs. 492–494; text-figs. 68–69.)

Colour pale or darker brownish-yellow to yellowish-brown; head-plate a little darker. Length 42 mm., wider in front, body strong; 51–57 pairs of legs. Head-plate with rough punctuation, much longer than wide, width greater in the first quarter; anterior margin nearly rectilinear, weakly sinuate; no frontal sulcus. The maxillipedes largely visible from above. Basal plate broad, half concealed by the head-plate; punctate. The first and second antennal joints with two irregular whorls of long bristles, joints 3–6 with one single basal whorl; short dense hairs begin on the sixth joint. The maxillipedes (fig. 494) extend beyond the frontal margin up to the middle of the second antennal joint. Coxa and trochantero-praefemur densely punctate, coxae with one long bristle laterally near the tip and with two teeth on the anterior margin. Inner border of the trochantero-praefemur zig-zag, the trochanter notch visible. Tarsus with strong basal tooth. Claw smooth; pleurocoxal suture parallel to the sides. Tergites from the second onwards with two deep episcutal sulci and two transverse rows of bristles, the lateral bristles of the posterior

row much longer than the rest. Intercalar tergites with one row of bristles. Sternites densely punctate. First sternite non-porose. Sternites 2-18 with one large rounded area ; on the nineteenth segment it is divided into two adjacent areas, and on the last 10 segments they are again combined into one. The second to the penultimate sternite with two small areas near the anterior angles, becoming distinct after maceration in caustic potash (text-fig. 68). Intercalar sternites divided ; on the anterior 20 segments they are separated

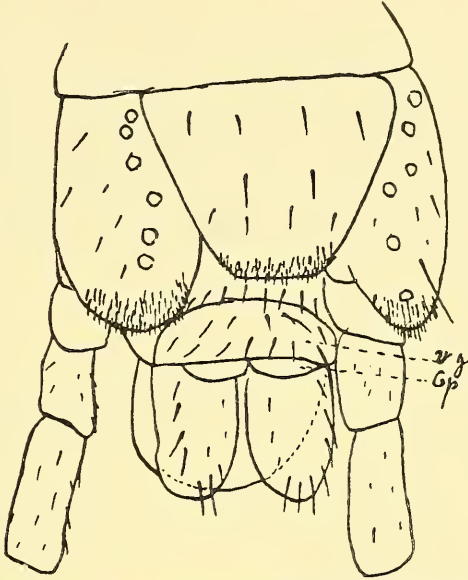


TEXT-FIG. 68.—*Polygonarea monospathis* Att. Twelfth segment, ventral surface.

from the intercalary pleurites, further back both are coalescent. First sternite in full contact with the maxillipedes. Last sternite large and broad, much narrowed and pubescent behind (text-fig. 69). Coxae of last legs with seven pores close to the margin of the sternite, and partly covered by it. Coxa of ♂ and ♀ with a rounded lobe densely covered with short hairs. No terminal pores.

Median piece of the labrum (fig. 470) with seven teeth ; the median tooth blunt, the others pointed ; the median half of the lateral pieces with long fringes, the lateral half smooth. Clypeus polygonally reticulated, the meshes large. The clypeal area with similar but finer reticulation, and paler than the rest of the clypeus : in front of the

area one row of little bristles. First maxillae with two pairs of long, spined lateral lobes, the lobes of the telopodite very slender (fig. 492). The distal inner angle of the second maxillae (fig. 492) prominent, the



TEXT-FIG. 69.—*Polygonarea monospathis* Att. Posterior end of ♀.

process blunt, conical, and covered with tubercles. The first and second joint of the telopodite with a small lateral tooth. Terminal claw simple.

Venster Ravine, Caledon (7367); Caledon (14650); Kogman's Kloof near Ashton (1680), Cape.

Gen. LESTOPHILUS Chamb.

1915. Chamberlin, Bull. Mus. Harvard Coll., lix, p. 522.

Distribution.—Haiti, Mexico.

Four species: *L. nesiotes* Chamb., *haitiensis* Chamb., *didymus* Chamb., *paucipes* Chamb.

Gen. BRACHYGONAREA Rib.

1910. Ribaut, Bull. Soc. Nat. Toulouse, xliii, p. 123.

Head-plate much longer than wide. No frontal sulcus. One

clypeal area present, with fine polygonal reticulation.* Median part of the labrum dentate, situated between the lateral pieces and separating them. Median half of the lateral pieces fringed. First maxillae with two pairs of long hairy lateral lobes; the telopodite distinctly 2-jointed. The coxae of the second maxillae connected by a small bridge; inner angle prominent. Femur and tibia with a lateral tooth. No chitinous lines. The maxillipedes project beyond the frontal margin. Pleurocoxal suture parallel to the lateral margin. Tergites bisulcate. Posterior margin of the sternites of the anterior segments bluntly angular, but without median lobe. No ventral pores. Last legs 7-jointed, with terminal claw. Coxa with a few pores opening singly under the margin of the sternite. Terminal pores wanting.

Distribution.—Little Namaqualand; Natal.

81. *Brachygonarea apora* (Att.).

1909. *Polygonarea apora* Attems, Schultze's Forsch. Reise, p. 25.

1910. *Brachygonarea apora* Ribaut, Bull. Soc. Hist. Nat. Toulouse, xliii, p. 105.

The first five joints of the last legs are densely covered with short hairs ventrally; the sternites have a deep median groove and the head-plate is densely punctate.

Howick, Natal (150171); Steinkopf, Little Namaqualand (Schultze).

Gen. GNATHORIBAUTIA Bröl.

1909. Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 336.

Head-plate much longer than wide; frontal sulcus distinct. Two rounded, finely punctate clypeal areas with one long bristle each. Median piece of the labrum with tubercular teeth, situated between the fringed lateral pieces and completely separating them. First maxillae with two pairs of lateral lobes. Coxae of second maxillae not coalescent, inner angle not prominent. Tibia with strong lateral tooth. No chitinous lines; the pleurocoxal suture parallel to the sides up to the end of the syncoxite. Basal plate narrow. Tergites bisulcate. No ventral pores. Sternites without lobe on the posterior margin.

* Ribaut, in his key to the genera, gave this genus as being without a clypeal area; he does not say that he had examined the only species (*apora*) and probably he had had no opportunity of doing so. I therefore assume that the contradiction of my statement is due to an error.

Last legs 7-jointed, no terminal claw. Coxa with singly opening dorsal and ventral pores. Sternite narrow. Terminal pores present.

Distribution.—North Africa.

One species : *G. agricola* (Att.).

Gen. PROSCHIZOTAENIA Silv.

1907. Silvestri, Jahrb. Hamb. Wiss. Anst., lxiv, p. 252.

1909. Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 337.

1910. Ribaut, Bull. Soc. Hist. Nat. Toulouse, xliii, p. 124.

Head-plate much longer than wide (frontal sulcus, clypeal area, and labrum not known). First maxillae without lateral lobes. Telopodite 2-jointed. Coxae of second maxillae connected by a bridge; the thickened edge long, the inner angle prominent. Telopodite without lateral tooth. No chitinous lines. The pleurocoxal suture parallel to the sides. Tergites? Ventral pores in one rounded area. Last legs 8-jointed, the claw replaced by a minute joint bearing one bristle. Coxa with dispersed pores opening singly beside and under the margin of the sternite. Terminal pores: in the key (p. 252) Silvestri says twice that they are wanting; in the description (p. 254), on the other hand, he says they are present.

The description of this genus requires to be completed with regard to some further points.

Distribution.—East Africa.

One species : *P. mediocris* Silv.

Gen. TELOCRICUS Chamb.

1915. Chamberlin, Bull. Mus. Harvard Coll., lix, p. 516.

Distribution.—Cuba, Haiti.

Five species : *T. hyper* Chamb., *multipes* Chamb., *maior* Chamb., *frater* Chamb., *cubae* Chamb.

Gen. SCHIZONAMPA Chamb.

1914. Chamberlin, Bull. Mus. Harvard Coll., lviii, p. 214.

Distribution.—Brazil.

One species : *S. manni* Chamb.

Gen. WATOPHILUS Chamb.

1912. Chamberlin, Bull. Mus. Harvard Coll., liv, p. 420.

Head-plate longer than wide. No frontal sulcus. Clypeal area ?

Median piece of the labrum with short teeth, separating the lateral pieces which have long teeth. First maxillae with two pairs of long lateral lobes. Coxae of the second maxillae with long thickened edge; the connection of the coxae unknown. Femur with inner and lateral processes. No chitinous lines. Pleurocoxal suture parallel to the sides; the maxillipedes project beyond the frontal margin. Basal plate narrow. Tergites bisulcate. No ventral pores. Last legs 8-jointed; coxa with few singly opening pores, most of them under the margin of the sternite. Terminal pores present.

Distribution.—United States of North America.

This genus requires a re-examination as regards some of its characters. It seems nearly allied to *Alloschizotaenia* Bröl.; perhaps it is identical.

One species: *W. alabamae* Chamb.

Gen. ALLOSCHIZOTAENIA Bröl.

1909. *Alloschizotaenia* Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 337.

1907. *Schizotaenia* Silvestri, Mitt. Nat. Mus. Hamb., xxiv, p. 250.

1909. *Schizotaenia* Attens, Sjöstedt's Kilimandjaro-Meru Exp., p. 8.

(Nec *Schizotaenia* Silvestri in Fauna Chilensis, p. 761, which belongs to *Schizotaenia* Ck.)

Head-plate much longer than wide. No frontal sulcus; one clypeal area present with fine polygonal reticulation. Median piece of the labrum with tubercular teeth, situated between the fringed lateral pieces. Syncoxite of the first maxillae without, telopodite with minute lateral lobe; the telopodite indistinctly 2-jointed. Coxae of the second maxillae connected by a small bridge; the thickened edges long. The inner angle prominent. The telopodite not laterally dentate. Maxillipedes very long, without chitinous lines. The pleurocoxal suture parallel to the sides. No ventral pores. Sternites without lobe on the posterior margin. Last legs 8-jointed, the claw replaced by a small bristly joint. Coxa with two pores. Terminal pores wanting.

Distribution.—East Africa.

One species: *A. minuta* (Silv.)=*Schizotaenia pluvia* Att.

5. Subfam. APHILODONTINAE Silv.

1909. Fam. *Aphilodontidae* Silvestri, Boll. Lab. Zool. Portici, iv, p. 52.

1909. Fam. *Geophilidae*, Tribe *Aphilodontini* Brölemann, Arch. Zool. Exp. Gen., (5), iii, p. 324.

1908. Fam. *Brasilophilidae* Verhoeff, Bronn's Class. u. Ord., p. 275.

1926. Subfam. *Aphilodontinae* Attems, Kükenthal's Handb. d. Zool., iv, p. 360.

Head-plate generally not or only a little longer than wide, rarely long. No frontal sulcus. Antennae filiform, tapering. No clypeal areas. Labrum more or less rudimentary, consisting of two smooth (not dentate or fringed) lateral pieces, the median piece wanting. Mandible with simple fringe of comb-like teeth. *Mecistauchenus* is said to have two pectinate lamellae.

Syncoxite of the first maxillae without lateral lobes, telopodite distinctly 2-jointed. Coxae of the second maxillae short, coalescent and forming a syncoxite or remaining free. No long thickened edge beside the gland-opening. Telopodite 3-jointed as is normal in the *Geophilomorpha*, or the joints more or less coalescent. In extreme cases the whole telopodite consists of one piece. No terminal claw. The pleurocoxal suture runs obliquely to the lateral margin. No chitinous lines. Telopodite 3-jointed; trochantero-femur and femur coalescent and bearing two papillae, with one bristle each, on the inside. Tibia with one bristle-bearing papilla. Tarsungulum normal. Basal plate broad, extending to the sides of the body. Tergites not sulcate. Terminal pores wanting. Last legs 6- or 7-jointed, with or without claw. Coxa with numerous singly and generally freely opening pores. Sternite narrow.

Distribution.—Argentine, Paraguay, Brazil, South Africa.

Key to the Genera of Aphilodontinae.

- 1a. Coxae of second maxillae not coalescent *Mecistauchenus* Bröl.
- 1b. Coxae of second maxillae coalescent, forming a syncoxite 2.
- 2a. Last legs 7-jointed, with terminal claw. The telopodite of the second maxillae more or less coalescent and consisting of one or two pieces
Philacroterium nov. gen.
- 2b. Last legs 6-jointed; sometimes the seventh joint is indicated by a minute knob. The telopodite of the second maxillae 2- or 3-jointed as usual . . . 3.
- 3a. Head-plate little longer than wide; the maxillipedes distant from the frontal margin. Telopodite of second maxillae 2-jointed, the first and second joints being coalescent *Aphilodon* Silv.
- 3b. Head-plate long; the maxillipedes extending beyond the frontal margin. Telopodite of the second maxillae 3-jointed as usual . . . *Mecophilus* Silv.

Gen. MECISTAUCHENUS Bröl.

1907. *Mecistauchenus* Brölemann, Bull. Soc. Ent. Fr., No. 16, p. 283.

1909. *Mecistauchenus* Brölemann, Arch. Zool. Exp. Gen., (5), iii, pp. 321, 335.

1908. *Brasilophilus* Verhoeff, Bronn's Class. u. Ordn., p. 286.

This genus, based on a single species (*M. micronyx* Bröl.), is placed by its author amongst the *Aphilodontinae*; but it is very different from the rest of this group in respect of the free non-coalescent coxae of the second maxillae, and needs to be re-examined.

Verhoeff established for the same species a genus "*Brasilophilus*," although he was acquainted with the older name of Brölemann. Verhoeff gives no reason for creating this new name.

Distribution.—Brazil.

One species: *M. micronyx* Bröl.

Gen. PHILACROTERIUM nov.

Head-plate nearly as long as wide. No frontal sulcus; antennae filiform, somewhat tapering. No clypeal area. Labrum consisting of the small, smooth lateral pieces; the median piece completely wanting. Mandible with a simple fringe of comb-like teeth. First maxillae without lateral lobes; the telopodite distinctly 2-jointed. Second maxillae: syncoxite without median suture; the first and second joint of the telopodite coalescent; the suture between second and terminal joint hardly visible or vanishing. No terminal claw. The pleurocoxal suture runs obliquely to the lateral margin, reaching it in the middle of the coxal length. No chitinous lines. Telopodite 3-jointed, the trochantero-praefemur and femur being coalescent. This compound joint has two papillae bearing one bristle each. Tibia with a similar papilla. Basal plate broad, extending to the sides of the body. The procoxae of the first pedal segment meet before the sternite, separating it from the maxillipedes. Tergites not sulcate. No ventral pores. Last legs 7-jointed; with terminal claw. Coxa with numerous freely opening pores. Terminal pores present.

Distribution.—Cape.

The two species are distinguished in the following manner:—

(1) *P. pauperum* n. sp.

Last sternite much narrowed and truncate behind; 43–51 pairs of legs. Tarsus of maxillipedes without basal tooth.

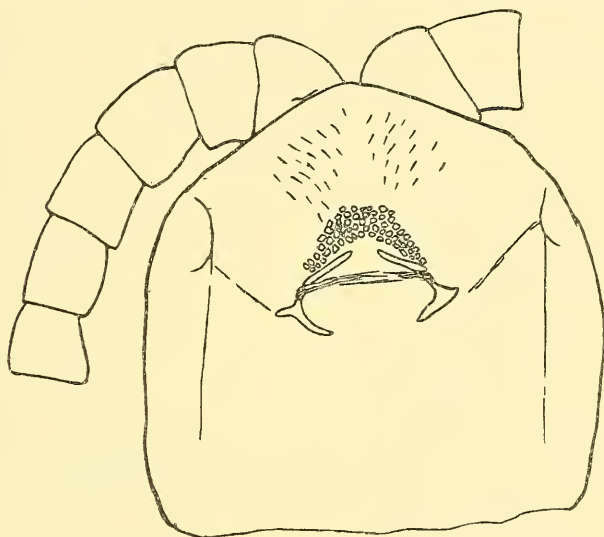
(2) *P. cribellatum* n. sp.

Sternite of last legs broad, rounded behind; ♂ with 53-65(69), ♀ with 55-71 pairs of legs. Tarsus of maxillipedes with basal tooth.

82. *Philacroterium cribellatum* n. sp.

(Text-figs. 70-75.)

Colour yellowish-brown. Length 48 mm.; body robust, tapering a little in front and behind; 55 (♂ and ♀) to 71 (♀) pairs of legs.

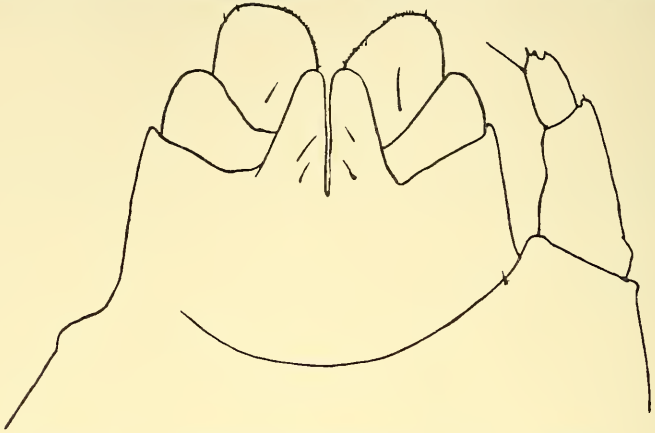


TEXT-FIG. 70.—*Philacroterium cribellatum* Att. Clypeus and labrum.

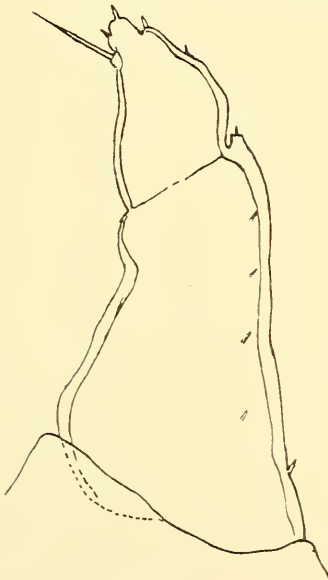
Head-plate nearly as long as wide, with dispersed hairs; no frontal sulcus. The posterior margin scarcely sinuate. The whorls of longer bristles on the basal antennal joints inconspicuous, the numerous hairs being nearly of the same length. No clypeal area. Basal plate broad with weakly convex lateral margins; from above only a small triangular part of the maxillipedes visible. The labrum consists of two weak, straight rod-like lateral pieces; between them a broad gap (text-fig. 70).

Both maxillae very small; the width of the second maxilla equal to one-third of the whole head. First maxillae (text-fig. 71) without lateral lobes; coxal process narrow, with two bristles. Telopodite distinctly 2-jointed, terminal joint with one long bristle. Coxae of the second maxillae coalescent. In the telopodite the first

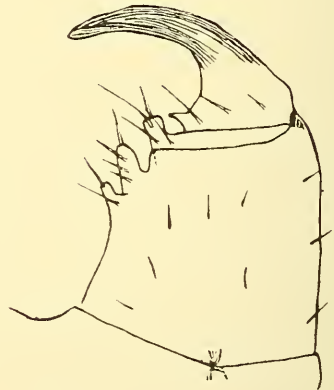
and second joint are coalescent; at the side of this compound joint distally is a little papilla bearing a minute point. The terminal



TEXT-FIG. 71.—*Philacroterium cribellatum* Att. First maxillae.



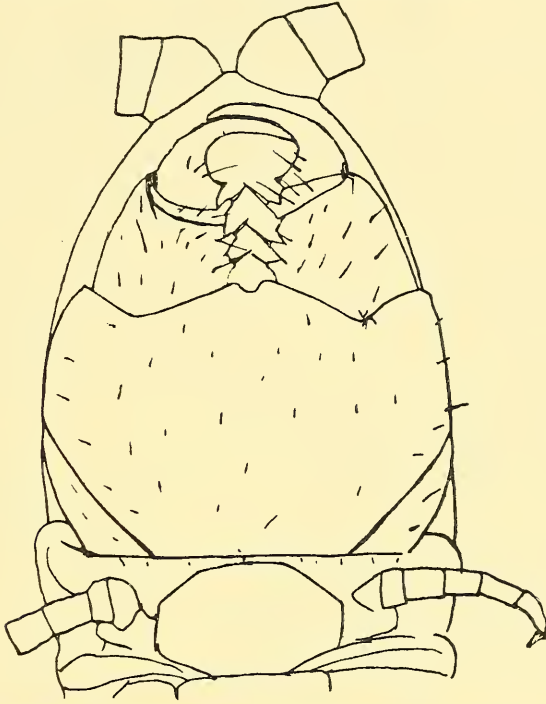
TEXT-FIG. 72.—*Philacroterium cribellatum* Att. Telopodite of second maxillae.



TEXT-FIG. 73.—*Philacroterium cribellatum* Att. Telopodite of maxillipedes.

joint indistinctly separated from the preceding one; the lateral aspect of the terminal joint with little points similar to those of the

preceding joint; at the tip, and near the tip on the inner side, one small point. On the inner side and at the base of this projection one long bristle (text-fig. 72). Mandible with a simple fringe of comb-like teeth. Maxillipedes (text-figs. 73 and 74): the coxa large, with dispersed hairs, without chitinous lines. The joints of the telopodite small; first and second joint coalescent, the suture between these

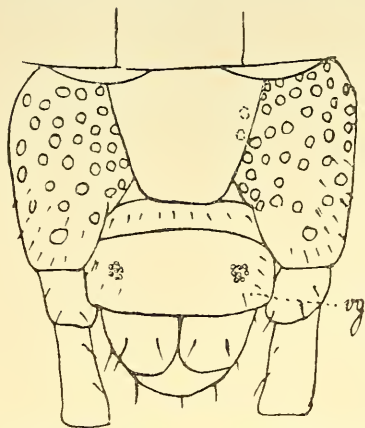


TEXT-FIG. 74.—*Philacroterium cribellatum* Att. Anterior end of ♀, ventral surface.

two joints remaining as a short line on the lateral face; the inner side of the fused joint has two bristle-bearing papillae. The following joint, *i.e.* the tibia, has a similar one. The maxillipedes do not reach the frontal margin. Claw smooth, a small basal tooth present.

Tergites not sulcate; the main tergites with two, the intercalary tergites with one row of hairs. The posterior margin of sternites 1-3 weakly angular, the remaining sternites rectilinear. Sternites with dispersed punctuation and hairs. The procoxae of the first pedal segment meet in front of the sternite. On the following five or six segments the middle of the intercalary sternites is concealed by the

sternites; further, the intercalar sternites are undivided and freely



TEXT-FIG. 75.—*Philacroterium cribellatum* Att. Posterior end of ♀, ventral surface.

visible. No ventral pores. Last sternite broad, a little narrowed posteriorly. Coxa of last legs with numerous freely opening ventral pores of various size. Terminal claw present. In the ♂ the last legs are moderately incrassate and densely covered with hairs ventrally; the last joint with long scattered hairs (text-fig. 75). The genital sternite of the ♀ with two small circular porose areas, distinct after maceration in caustic potash (the ♂ was not macerated, and therefore the areas were not visible). Terminal pores present.

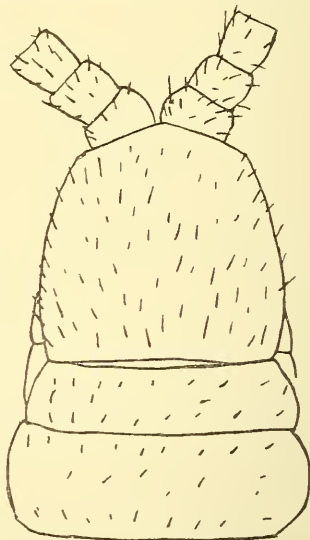
Cape Province.—Table Mt., Platteklip Ravine (7675); Cape Peninsula (23354), Kalk Bay (150118), Ceres (7522), Kogman's Kloof (1680), Hottentots Holland (1003), Houw Hoek, Caledon (7617, 7346).

83. *Philacrotherium pauperum* n. sp.

(Text-figs. 76–81.)

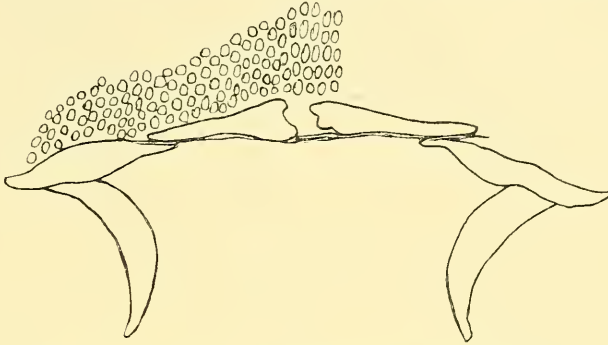
Colour yellowish - brown. Length 30 mm.; body clumsy, the greatest width in the posterior half; 45–51 pairs of legs (♀).

Head-plate (text-fig. 76) nearly as long as wide, narrowed anteriorly, the posterior margin weakly sinuate; densely punctate and pubescent; no frontal sulcus. Antennae tapering, the whorls of long bristles inconspicuous, being little longer than the dense hairs. Basal plate broad, extending nearly to the sides of the body, its sides slightly convex. From above only a small part of the maxilli-

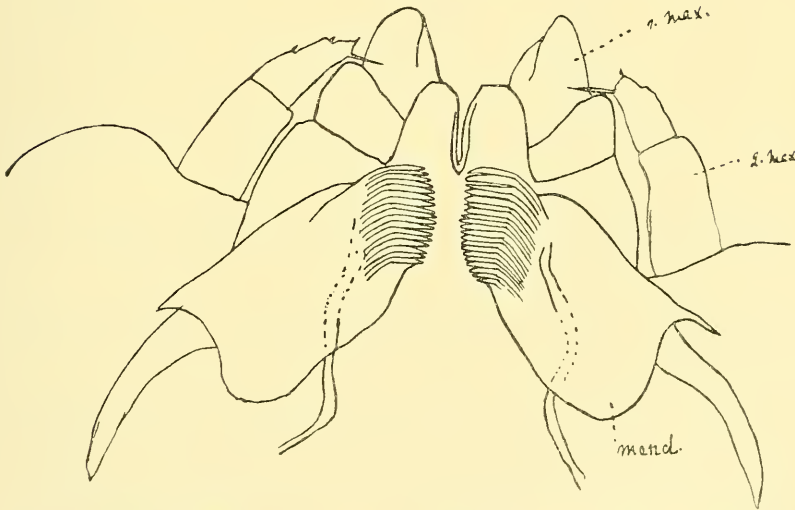


TEXT-FIG. 76.—*Philacrotherium pauperum* Att. Anterior end of ♀, dorsal view.

pedes visible. Clypeus with uniformly round reticulation, no clypeal area; in front of the middle several long bristles. The labrum (text-fig. 77) corresponding with the description of *Aphilodon* by Silvestri; two small medially enlarged and irregularly toothed plates



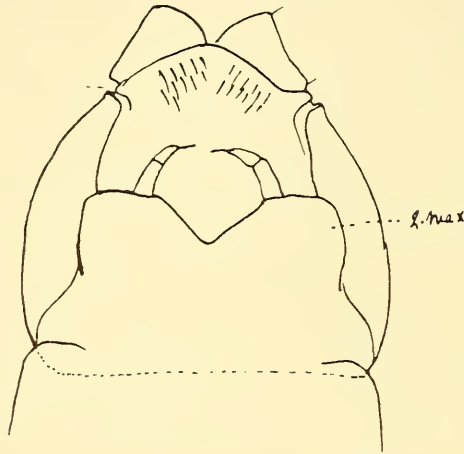
TEXT-FIG. 77.—*Philacroterium pauperum* Att. Labrum.



TEXT-FIG. 78.—*Philacroterium pauperum* Att. Mandibles and maxillae of ♀.

are separated by a space. The median piece is completely lacking. Mandible with a simple fringe of comb-like teeth. First maxillae and telopodite of the second maxillae extremely small. First maxillae (text-fig. 78) as in *P. cribellatum*, the terminal joint distinctly separated from the basal joint of the telopodite; no lateral lobes;

a few small bristles on the aboral side. The telopodites of the second maxillae are not inserted on the sides of the syncoxite, but the syncoxite forms a rounded shoulder laterally (text-fig. 79). The first and second joints of the telopodite coalescent; terminal joint without claw; with one long bristle just below the tip and one little joint at the tip. Maxillipedes (text-fig. 80) densely covered with short hairs. Coxa large; no chitinous lines; anterior margin sinuate; no teeth; the pleurocoxal suture oblique, reaching the lateral margin before the middle of the coxa. Telopodite very small, distant from the lateral and frontal margin, 3-jointed, the first and

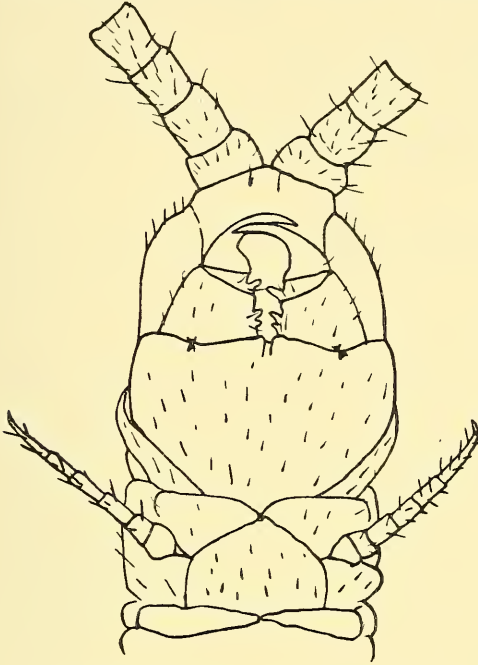


TEXT-FIG. 79.—*Philacroterium pauperum* Att. Second maxillae.

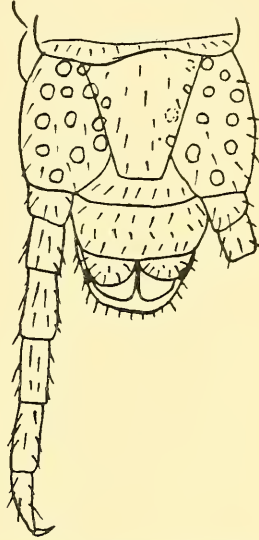
second joints coalescent and bearing two papillae. The third joint (tibia) with a similar one. Tarsus without basal tooth. The claw smooth (not notched).

Tergites not sulcate; the main tergites with several irregular intercalary tergites with one row of hairs. The procoxae of the first pedal segment meet before the sternite. The first four intercalary sternites are divided in the middle line; from the fifth onwards they are undivided. Sternites with straight posterior margin, scattered punctuation and hairs. No ventral pores. Last sternite very narrow, much narrowed and truncate posteriorly, with dispersed hairs. Coxa with numerous dark-coloured ventral pores, some opening under the margin of the sternite. Terminal claw present (text-fig. 81). Terminal pores present.

Cape Province.—Table Mt., Newlands Slope (7642), Platteklip Ravine (7677, 7688) ; Kalk Bay (150118), Knysna (1579), Coldstream, Humansdorp (5305), Zonder End Mts. (4100).



TEXT-FIG. 80.—*Philacroterium pauperum* Att.
Anterior end of ♀, ventral view.



TEXT-FIG. 81.—*Philacroterium pauperum* Att. Posterior end of ♀, ventral view.

Gen. APHILODON Silv.

1898. Silvestri, Nova. Geoph. Argent. Com. Mus. Nac. Buenos Aires, i, p. 29.

1903. Attems, Synop. d. Geoph., p. 283.

1908. Verhoeff, Bronn's Class. u. Ordn., p. 279.

1909. Silvestri, Boll. Lab. Zool. Portici, iv, p. 53.

Head-plate a little longer than wide, narrowed anteriorly. No frontal sulcus. Antennae filiform, tapering. Labrum more or less rudimentary. First maxillae without lateral lobes, the telopodite distinctly 2-jointed. Second maxillae with syncoxite and 3-jointed telopodite, without terminal claw. The pleurocoxal suture runs obliquely to the sides, reaching the lateral margin before the middle. Telopodite 3-jointed, the first and second joints coalesced.

Maxillipedes distant from the frontal margin. Basal plate broad, extending to the sides of the body. The procoxae of the first pedal segment meet before the sternite. Tergites not sulcate. Last legs 6-jointed. No terminal claw. Coxa with numerous pores opening freely. Terminal pores present.

Distribution.—South America, South Africa.

Four species are recorded from South America and one species from South Africa. All these species seem to be very similar; Silvestri, their author, gave no key to them.

84. *Aphilodon weberi*, Silv.

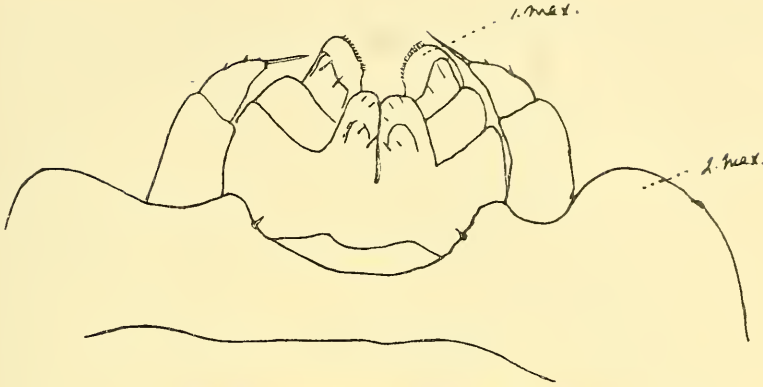
1909. Silvestri, Contrib. Conosc. Chilop., iv, p. 59; Bull. Lab. Zool. Portici, iv.

(Pl. XIX, fig. 479; text-figs. 82–84.)

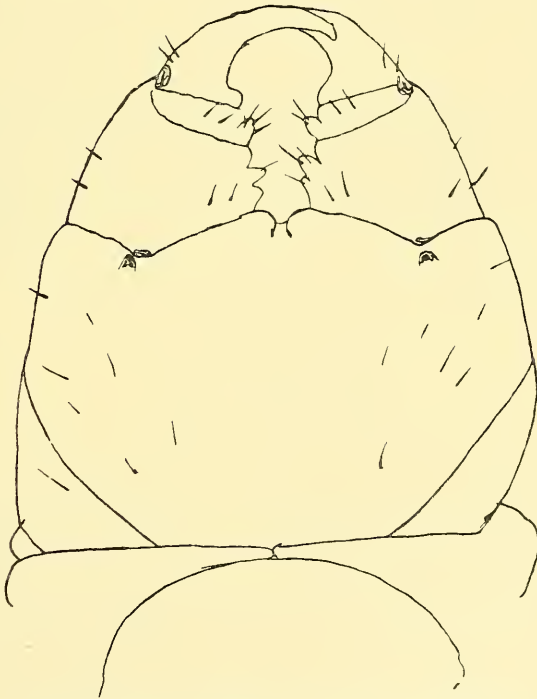
Head-plate as above. The basal six joints of the antennae with longer bristles arranged in two whorls, and scattered shorter hairs. The difference between the two kinds of hairs not great. Clypeus polygonally reticulate; the meshes in the middle smaller; on each side of this median spot one group of a dozen short bristles. No distinctly defined labrum; the polygonally reticulated median part of the clypeus passes over into a smooth lamella between the fulera; the free margin is smooth (fig. 479). (The description of *Aphilodon spegazzinii* given by Silvestri does not agree with my observations.) Mandible with a simple fringe of comb-like teeth. First maxillae (text-fig. 82) without lateral lobes; the coxal process bearing some minute spines. Telopodite 2-jointed; the terminal joint with some minute and two larger spinules, the inner side with microscopic hairs.

The coxae of the second maxillae completely coalescent, laterally from the insertion of the telopodite the syncoxite forms a broad rounded shoulder, similar to that of *P. pauperum*. Telopodite 2-jointed, the first and second joints coalescent. The terminal joint with one long terminal bristle and 2–3 minute spinules on the lateral side. The maxillipedes (text-fig. 83) do not reach the frontal margin. No chitinous lines. The space between the telopodite rounded and sinuate, no teeth. The first and second joints of the telopodite coalescent, the inner margin of this fused joint bearing two bristled papillae; the tibia with one similar papilla.

Tergites not sulcate; with dispersed hairs. First sternite rounded anteriorly and separated from the maxillipedes by the meeting of



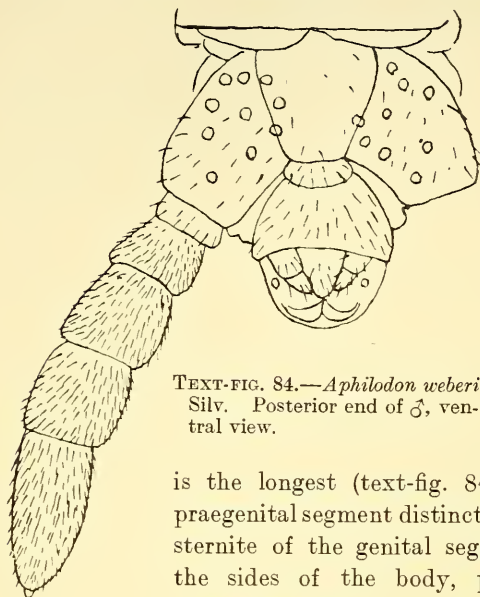
TEXT-FIG. 82.—*Aphilodon weberi* Silv. Maxillae.



TEXT-FIG. 83.—*Aphilodon weberi* Silv. Maxillipede.

ventral pleurites (procoxae of Verhoeff). The remaining sternites nearly quadrate, with dispersed fine hairs. The intercalary sternites

visible as an undivided plate from the second segment onwards. No ventral pores. Stigmata circular. Praescutellum several times



TEXT-FIG. 84.—*Aphilotodon weberi* Silv. Posterior end of ♂, ventral view.

as large as the scutellum. Last sternite narrowed and truncate posteriorly. Last legs with six well-developed joints and a minute rounded, hairless knob, the vestigial remains of a seventh joint. Coxa with several large freely opening ventral pores. Coxa and trochanter with dispersed, the rest of the joints with dense hairs. The sixth joint

is the longest (text-fig. 84). The sternite of the praegenital segment distinctly visible, pubescent. The sternite of the genital segment large, extending to the sides of the body, pubescent. Male genital appendages 2-jointed. Terminal pores present.

Cape Province.—Table Mt., Newlands Slope (7687); Hogsback, Amatola Mts. (B. 813).

"Constantia, South Africa" [near Cape Town] (Silv.).

Gen. MECOPHILUS Silv.

1909. Silvestri, Rendic. R. Acc. Lincei, (5), xviii, p. 269.

1909. Silvestri, Boll. Lab. Zool. Portici, iv, p. 60.

Head-plate long. No frontal sulcus. Labrum rudimentary. (No details given by Silvestri.) Mandible with a simple fringe of comb-like teeth. First maxillae without lateral lobes, the telopodite distinctly 2-jointed. Coxae of the second maxillae coalescent, forming a syncoxite; telopodite 3-jointed, without terminal claw. Maxillipedes long, far exceeding the frontal margin. Coxae long, without chitinous lines. First and second joints of telopodite coalescent, bearing papillae on the inner side (number of these papillae and bristles unknown). Basal plate very long, extending to the sides of the body. Character of tergites unknown. No ventral pores. Last

legs 6-jointed, without terminal claw ; coxae with numerous freely opening pores. Terminal pores present.

Distribution.—Brazil.

One species : *M. neotropicus* Silv. (requires re-examination in some respects).

Geophilus grandiceps Por.

1893. Porat, Bih. Sv. Ak. Handl., xviii, p. 47.

Cape Town.

I can make nothing of this description. *Species inquirenda*.

II. CLASS SYMPHYLA.

Gen. HANSENIELLA Bagn.

85. *Hanseniella capensis* (Hans.).

1903. *Scutigera capensis* Hansen, Quart. J. Micr. Sci., xlvii, p. 48, pl. iii, fig. 3 ; pl. iv, fig. 1.

1913. *Hanseniella capensis* Bagnall, J. Linn. Soc., xxxii, p. 198.

I have nothing to add to the excellent description of Hansen.

Cape Province.—Table Mt. (4100), Newlands (150123), River Zonder End (5271, 5274), Mossel Bay ; Wynberg, Knysna. *Natal*.—Howick (150173).

Cape Peninsula, Constantia (Hansen).

III. CLASS DIPLOPODA.

1. Subclass *Pselaphognatha*.

Synopsis of the Genera of Pselaphognatha.

- 1a. Sensitive cones of the palpi 2-jointed *Macroxenus* Bröl.
- 1b. Sensitive cones of the palpi not articulated 2.
- 2a. Anal segment with one unpaired median brush of bristles (sometimes lateral brushes as well), or the bristles equally distributed without forming brushes 3.
- 3a. The bristle brush of the anal segment contains bristles of two kinds, with and without barbed hooks 4.
- 4a. Last joint of the antennae as long as the seventh and without sense-papillae. Palpi of gnathochilarium very short, with four cylindrical sensitive bristles. No eyes *Hypogexenus* Silv.
- 4b. Last joint of the antennae very small, much smaller than the seventh, with four sense-papillae. Palpi of gnathochilarium long, tapering, with more sensitive bristles. Eyes present 5.

- 5a. Tergites with one brush of bristles on each side and one or several rows along the posterior border. The bristles of the anal segment with two barbed hooks *Monographis* Att.
- 5b. Tergites with two brushes of bristles on each side and one row along the posterior border. The bristles of the anal segment with four barbed hooks *Ankistroxenus* Att.
- 3b. All long bristles of the anal segment of one kind, without barbed hooks 6.
- 6a. Tergites with long slender bristles only *Saroxenus* Cook.
- 6b. Tergites with long slender bristles and short broad (shingle-shaped) bristles 7.
- 7a. Eleven segments, nine lateral brushes of bristles *Synxenus* Silv.
- 7b. Twelve segments, ten lateral brushes of bristles. Head very large, the largest part of the animal; the long bristles of the anal segment uniformly distributed, without forming close brush-groups. Penis very long *Schindalmonotus* nov. gen.
- 2b. Anal segment with two brushes of bristles directed backwards (no unpaired median brush). Sometimes two lateral brush-groups as well 8.
- 8a. Thirteen segments; anal segment with four brush-groups, two directed backwards, two laterally *Koubanus* nov. gen.
- 8b. Eleven segments; anal segment with two brushes directed backwards, sometimes groups or rows of bristles on the dorsal surface of this segment as well 9.
- 9a. Last antennal segment small, much smaller than the seventh. Eyes present. Claw of legs 3-lobed. Tergites with two transverse rows of short broad bristles along the posterior border *Polyxenus* Latz.
- 9b. Last joint of antenna nearly as long as the seventh joint. No eyes, claw of legs simple. Tergites with one transverse row of longer and more slender bristles along the posterior border *Lophoproctus* Poc.

Gen. SCHINDALMONOTUS nov.

Twelve segments; 10 bundles of pleural bristles, 17 pairs of legs, first segment apodous. Segments 2-4 with one pair of legs each, segments 5-11 with two pairs of legs each, one apodous terminal segment. Head very broad, eyes present, four groups of long bristles. Antennae 8-jointed, the sixth joint the largest, the eighth half as long as the seventh. First segment with four compact groups of long bristles, without shingle-shaped bristles, and without pleural bristle-groups. Segments 2-11 with two lateral and two pleural groups (one on each side) of long bristles, and three rows of shingle-shaped bristles. Last segment with numerous long bristles (on all sides, not arranged in groups or separate terminal brushes and all of one kind, without barbed hooks), with shingle-shaped bristles. Penis very large. The tactile bristles of the legs gradually tapering.

86. *Schindalmonotus hystrix* n. sp.

(Pl. I, figs. 1-7 ; Pl. XVII, figs. 425, 426.)

The adult has 12 body segments with 17 pairs of legs, and 10 pairs of pleural groups of bristles. The first and last (anal) segments are apodous, segments 2-4 have one pair of legs each, segments 5-11 two pairs. Juveniles with 9 segments have 10 pairs of legs and 7 pleural bristle-groups. Juveniles with 10 segments have 11 pairs of legs and 8 pleural bristle-groups. Juveniles with 11 segments have 14 pairs of legs and 9 pleural bristle-groups. The penultimate segment of animals with 9 and 11 segments has one pair of legs, while in those with 10 segments it is apodous.

Colour dirty yellowish, the bristles black. Length up to 4 mm. The head is large, the anterior margin scarcely sinuate ; the labrum (fig. 2) distinctly separated from the clypeus by a fine line, has a different surface from the rest of the head. On the fore part are several rows of little scales arranged like roofing tiles, becoming gradually smaller and passing into a fine granular structure. On the clypeus several rows of long hairs. The eyes are large prominences on the sides of the head, each eye consisting of about 10 ocelli, weakly pigmented. The antennae are 8-jointed, the sixth joint by far the largest, the seventh half as long as the sixth, the eighth very small, not half as long as the seventh. The walls are densely perforated by little canals ; the hairs arising from the openings of these canals are minute. The third, fifth, sixth, and seventh joints with several long pointed simple bristles, the sixth and seventh joints with one or two compressed, blunt bristles. Last joint with four sensitive cones (fig. 426). The palps (fig. 425) belong to the gnathochilarium, and not to the first pair of legs as I thought when describing *Monographis*. Here the circumstances are clearer, and I fully agree with the view of Reinicke. Each palp is slender, gradually diminishing towards the tip, and bearing about 20 sensitive papillae. The foveae laterales are visible from below in the sinus between the anterior and middle part of the head as blunt cones. The organs declared by Verhoeff to be auditory hairs are situated on the upper side of the head on the median side of the eyes, each hair resting on a little truncate cone. I could see only two such hairs on each side. The bristles are of two kinds : (1) long slender bristles ; (2) short, broad scales. The bristles are present on the head and on all the segments, the scales on segments 2-12. On the head the bristles are arranged in four large groups in

the shape of an arc, open behind. Seen from above the groups are completely separated, seen from below they merge gradually, being connected by single bristles. The first apodous segment has two groups of these bristles. Segments 2-11 have four groups of bristles each, two on each side, one dorso-lateral and one pleural. The pleural groups form rounded protuberances on the sides of the body and the bristles are arranged in very regular transverse rows on these cushions (fig. 3). There are about 12 rows. The bases of the bristles of each row look like little cups with a thickened wall, and all the cups of a row are connected and appear in profile as a sinuate line (fig. 4). The bristles are inserted in an oblique direction. The last (anal) segment is covered all over with a great number of these bristles, not forming a closed brush-group. Only the median anterior part of the dorsal surface and the median part of the ventral surface are free. The bristles are a little curved; smooth in the basal half, bearing little lateral points in the distal half (fig. 5).

The second kind of bristles consists of broad scales. They are arranged in two transverse rows along the posterior border and in one row along the anterior border of segments 2-11, and in one transverse row in the middle of the anal segment. The scales along the posterior border are blackish, darker than the pale scales on the anterior margin. The scales have a slender handle-shaped base, their margins nearly parallel; the top is a little oblique and finely serrated. The surface is furrowed by fine longitudinal lines, the intervals between the lines finely cross-striated (fig. 6).

The last segment is a blunt cone and contains the anus. I have changed my view on this point; the anus does not belong to the penultimate segment but to the last. The bristles of the anal segment are somewhat longer and more slender than on the other segments, but otherwise the same. No barbed hooks. The second pair of legs is 8-jointed. All joints covered with minute hairs and some long tactile bristles. The distal margin of joints 1-6 with rigid cilia, somewhat longer than the minute hairs. The tactile bristles are simply narrowed and pointed, not abruptly narrowed in the middle as in *Monographis*. I saw two bristles on the first joint and one bristle on joints 2-7. The terminal claw is 2-lobed, with one small bristle above. The penis (fig. 7) is long and thick, cylindrical, with fine circular furrows except at the tip, which is smooth and bears some bristles. The penis extends as far as the coxae of the sixth pair of legs.

Cape Province.—Gt. Winterhoek (2251, B. 2242), Knysna (7432),

St. James (150103), Hout Bay, Cape Peninsula (4744), Caledon (B. 3407), Montagu (B. 4113), Mossel Bay (1642), Ntaba, Kandoda, near Debe Nek (B. 2274). *Transvaal*.—Kaapmuiden (B. 4039). *Portuguese E. Africa*.—Masiene, Chai Chai.

This genus is especially interesting in regard to the number of legs and segments. Hitherto the view generally held has been that the *Pselaphognatha* have 11 segments and 13 pairs of legs. Only Lucas has published drawings of two Algerian species with 11 and 12 segments. But we must suppose that he has overlooked the first segment, because the true first segment of all *Pselaphognatha* known to me is small and has no lateral bundles of bristles, while the drawings of Lucas show large first segments with two lateral bundles of bristles. The number of legs is not mentioned in the text nor visible in the drawings. Lucas's species has therefore 12 and 13 segments.

One of his species, *Polyxenus rubromarginatus* (= *Macroxenus rubromarginatus* Brölem.), has certainly a great resemblance to our species, having the same scale-like dorsal bristles and the same unusual number of segments, that is if my supposition is correct. It differs in the shape of the body, being largest in the middle, and in the arrangement of the bristles of the anal segment. In *S. hystrix* the long bristles are not arranged in a brush-group, while in *rubromarginatus* they form three distinct brush-groups. Whether the bristles of the anal brushes in *rubromarginatus* are all of the same kind or whether they include bristles with barbed hooks is not known.

Gen. MONOGRAPHS Att.

1907. Attems, Javanische Myr. Mitt. Nat. Mus. Hamburg, xxiv, p. 96.

Eleven segments with 13 pairs of legs and 9 pleural bristle-groups. First segment apodous. Segments 2-4 with one, segments 6-11 with two pairs of legs. Segment 21 apodous. Head broad, eyes present, four groups of long bristles. Antenna 8-jointed. The eighth joint very small, with four sensitive papillae. First segment with four groups of long bristles. Tergites with two groups of long thin bristles and one row along the posterior border. Anal segment with one median pencil of bristles (partly like those of the preceding segments, partly with barbed hooks) and with one row on the posterior margin. All bristles long and slender. Penis short and thick. The tactile bristles of the legs abruptly narrowed in the middle.

Two species: one from Java, one from South Africa.

87. *Monographis schultzei* Att.

1909. Attems, L., Schultze's Forsch. Reise, p. 36.

Prince Albert, Cape, under stones (1640).

Steinkopf, Little Namaqualand ; Kalahari, Lehututu (Att.).

Gen. KOUBANUS nov.

Type: *Polyxenus platycephalus* Lucas, Explor. Scient. Algérie, p. 322, pl. i, fig. 1, 1849.

Thirteen segments. The drawing shows 12 tergites, the first with two large lateral brushes. The fact that the first large lateral brushes belong to the second segment in the other genera allows us to presume that Lucas overlooked the first segment. Eleven lateral brushes of bristles. Head, with six brushes of bristles, very large, larger than the rest of the body ; the body gradually tapers backwards. Tergites with two groups of bristles on each side, one group with very short small bristles, and one with very long thin bristles. (Pleural brushes as well.) Anal segment with four brush-groups (barbed hooks ?). Penis long. Last joint of the antenna very short, not half the length of the seventh joint.

The shape of the body much resembles that of *Schindalmonotus*. But the two genera differ in the bristles, the number of anal brush-groups, head-brushes, etc.

2. Subclass **Chilognatha** Latr.

1. DIVISION OPISTHANDRIA Verh.

1894. Suborder *Opisthandria* Verhoeff, Verh. Zool. Bot. Ges. Wien, p. 17.

1898. Order *Oniscomorpha* Attems, Syst. d. Polydesmiden, i, p. 226.

1910. Super-order *Opisthandria* Verhoeff, Dipl. Deutschl., p. 19.

1910. Order *Opisthandria* Verhoeff, Nov. Acta., xcii, p. 213.

1914. Division *Oniscomorpha* Attems, Indo.-Austral. Myr., p. 137.

1926. Division *Opisthandria* Attems, Kükenthal's Handb. d. Zool., iv, p. 114.

The legs of the seventh somite (and of the adjacent somites) not modified in the ♂. Instead of anterior gonopods the ♂ possesses

posterior gonopods (or telopods, Verh.), these being accessory legs of the ♂, not present in the ♀. Sternites divided into two halves. The tracheae dichotomously branched (not arising in great numbers from the same point on the tracheal trunk). The external tooth-piece of the mandible coalescent with the median piece. Epipharynx with free scaffold. The genital glands of ♂ and ♀ open on the coxae of the second pair of legs.

It is not easy to choose a name for this group. Pocock, 1887, divides the subclass Chilognatha into two Orders: *Oniscomorpha* and *Helminthomorpha*. The first is characterised, "Pedibus qui instrumentum copulativum forment, segmento ultimo additis, tracheis ramosis . . . etc." In 1894 Pocock proposed a new Order, *Limacomorpha*, "in many respects intermediate in character between the *Oniscomorpha* and some families of *Helminthomorpha*," as he says. In 1898 I combined the *Limacomorpha* with the *Oniscomorpha*, because the affinity between these two Orders is much greater than that between *Limacomorpha* and *Helminthomorpha*, and I gave to this group the name *Oniscomorpha sens. lat.* I now change this name and accept the name *Opisthandria*, to avoid the inevitable confusion resulting from Division and Order having the same name.

The *Limacomorpha* are not represented in the South African (nor in the whole Ethiopian) fauna.

ORDER ONISCOMORPHA Pocock.

- 1887. Order *Oniscomorpha* Pocock, Ann. Mag. Nat. Hist., (5), xx, p. 291.
- 1889. Family *Glomeridae* Latzel, Myr. öst. Ung. Mon., ii, p. 81.
- 1895. Order *Oniscomorpha* Cook, Ann. N. York Ac. Sci., ix, p. 2.
- 1896. Order *Oniscomorpha* Silvestri, I Diplopodi, p. 86.
- 1898. Suborder *Glomeroidea* Attems, Syst. d. Polydesmiden, i, p. 226.
- 1903. Order *Oniscomorpha* Silvestri, Diplop. Anatom., p. 22.
- 1910. Order *Oniscomorpha* Verhoeff, Diplop. Deutschl., p. 20.
- 1914. Order *Pentazonia* Attems, Indo-Austral. Myr., p. 137.
- 1926. Order *Oniscomorpha* Attems, Kükenthal's Handb. d. Zool., iv, p. 117.

The name *Pentazonia* was proposed by Brandt in 1833 for the *Glomeridia* and *Sphaerotheria*; but the classification of the *Chilognatha* as *Pentazonia*, *Trizonia*, and *Monoazonia* is so vague that it

is better to abandon this old name (having indeed priority, but so badly bestowed), and I now prefer the new name *Oniscomorpha*.

Twelve or thirteen somites; ♀ with 17 or 21, ♂ with 19 or 23 pairs of legs (in the ♂ the telopods are included). The body can be rolled up into a ball, the head and legs being concealed when it is thus rolled up. The sternites are divided, each half lateral to the coxae; the pleurites on the lateral side of the sternites. Gnathochilarium without lamellae linguales. The last two pairs of appendages of the ♂ are telopods; the second pair of telopods especially are greatly modified. The last tergite very large, not covered by the preceding tergite.

1. Suborder GLOMERIDIA Brandt.

1833. *Glomeridia* Brandt, Bull. Soc. Nat. Moscou, vi, p. 194.

1884. Subfam. *Glomerinae* Latzel, Myr. Oest. Ung. Mon., ii, p. 83.

1894. Fam. *Glomeridae* Pocock, Max. Weber's Reise, iii, p. 322.

1910. Suborder *Plesiocerata* Verhoeff, Diplop. Deutschl., p. 21.

1913. Suborder *Plesiocerata* Brölemann, Biospelaeogica, xxxi; Arch. Zool. Exp., lii, p. 387.

1914. Suborder *Glomeridia* Attems, Indo-Austral. Myr., p. 137.

1926. Suborder *Glomeridia* Attems, Kükenthal's Handb. d. Zool., iv, p. 120.

♂ with 19, ♀ with 17 pairs of appendages (legs and telopods). The sternal plate is a syntergite formed from two somites. Behind the sternal plate 9 or 10 tergites. Ten pairs of pleurites. Stipites gnathochilarii with two palpal lobes. The ocelli in one row or wanting. The telopods (eighteenth and nineteenth pairs of appendages) without stridulating organs. The seventeenth pair sometimes modified (adventive telopod).

The Glomeridia are not represented in the South African fauna.

2. Suborder SPHAEROTHERIA Brandt.

1833. *Sphaerotheria* Brandt, Bull. Soc. Nat. Moscou, vi, p. 198.

1884. Subfam. *Sphaerotheria* Latzel, Myr. Oest. Ung. Mon., ii, p. 123.

1894. Fam. *Zephroniidae* Pocock, Max. Weber's Reise, p. 325.

1896. Fam. *Sphaerotheridae* Silvestri, I Diplopodi, p. 88.

1910. Suborder *Chorizocerata* Verhoeff, Diplop. Deutschl., p. 20.

1914. Suborder *Sphaerotheria* Attems, Indo-Austral. Myr., p. 139.

1926. Suborder *Sphaerotheria* Attems, Kükenthal's Handb. d. Zool., iv, p. 117.

♂ with 23, ♀ with 21 pairs of appendages (the twenty-second and twenty-third pairs of the ♂ being telopods). Sternal plate a simple somite. Behind the sternal plate are eleven tergites. Eleven pairs of pleurites. Stipites gnathochilarii with one palpal lobe. Ocelli numerous in a round spot containing several rows. Telopods (twenty-second and twenty-third pairs) with stridulating organs (always ?). Twenty-first pair not modified.

The great majority of the *Sphaerotheridae* are very imperfectly known, and therefore it is difficult if not impossible to define the genera or families.

The South African *Sphaerotheridae* were treated in a special paper by Silvestri,* who describes seven hitherto known and fourteen new species of *Sphaerotherium*, without entering into the question of which are the correct generic names. All the South African *Sphaerotheridae* belong to one genus, it is true, but what is its name ?

In 1833 Brandt proposed the genus *Sphaerotherium* with five species, four from the Cape and one *patria ignota*; the species were called *rotundatum*, *compressum*, *liechtensteini*, *elongatum* from the Cape; *punctatum* from an unknown locality. Since then a great number of species have been published, generally in a very incomplete form. In 1886 Bourne described in detail the telopods and the stridulating organ of two species of *Sphaerotherium*, called by him *S. obtusum* Koch and *retusum* Koch, in which connection it may be observed that the identification of Koch's species is a little arbitrary, all the species being so vaguely defined at the time when Bourne wrote his paper. We do not know why he chose just these names for the animals which he examined.

In 1902 Saussure proposed the genus *Bournellum* for the species possessing the stridulating organ described by Bourne, and placed the species from Madagascar, which have a differently formed stridulating organ, in the old genus *Sphaerotherium*. In describing the Myriopods of the Deutsche Südpolar Expedition I followed Saussure and accepted the genus *Bournellum* without examining the correctness of this name. It is now evident that *all* the South African species of *Sphaerotheridae* possess the same stridulating organ as described by Bourne for *obtusum* and *retusum*, so therefore does the type-species of the genus *Sphaerotherium*, *S. rotundatum*. Hence the species with Bourne's stridulating organ on the telopods must retain the old name *Sphaerotherium*; the name *Bournellum* proposed by Saussure must be

* Silvestri, Materiali per una revisione dei Diplopoda Oniscomorpha, Boll. Lab. Zool. scuola sup. Portici, iv, 1910.

dropped and the species described by him as *Sphaerotherium* must have a new generic name. These changes are certainly regrettable, but they are inevitable.

On account of the incompleteness of the old descriptions it is quite impossible to say exactly what forms Brandt, Koch, Porat, etc., intended, and the whole of the old synonymy is purely arbitrary, most of the descriptions containing only characters found in any species of the whole family. Silvestri has examined some type-specimens of Porat and arranged them thus: (A) The species described as new by Porat; (B) the species connected by Porat with an old name, in the sense of Porat. But whether Porat used these old names in the same sense as the former authors remains uncertain. We can therefore say only with this limitation, that the species *Sphaerotherium rotundatum* Brandt is fixed, *i.e.* in the sense given it by Silvestri. But if one doubts whether *rotundatum* Porat-Silvestri is identical with *rotundatum* Brandt, one must bear in mind that all the South African species belong to the same genus, and that Brandt certainly had members of this genus before him when in 1833 he described *S. rotundatum*, *S. compressum*, etc. Consequently the South African species belong to *Sphaerotherium* sens. strict., and the species from Madagascar to a genus called *Globotharium* Bröl.

In the Myr. d. Deutschen Südpolar Expedition I enumerated the different patterns of stridulating organs as follows:—

I. One or several keels on the first telopodite joint of the anterior gonopod.

II. Rasping-organs on the tarsus of the first gonopod and corresponding spinules on the process of the tibia.

III. Transverse ridges on the tibia of the posterior gonopods.

IV. Rasping-organs on the tarsus of the posterior gonopod and corresponding little spinules on the tibial process of the same appendage.

Key to the Genera of Sphaerotheridae.

- 1a. Femur of the posterior telopod with several transverse ridges. Pygidium with two groups of tubercles on the internal surface. Seventh joint of the antenna visible, short, cylindrical. Vulva consisting of three pieces
Sphaerotherium Bröl.
- 1b. Femur of the posterior telopods without ridges or keels 2.
- 2a. Praefemur of the anterior telopod with one or several strong keels (stridulating organs) 3.
- 3a. Seventh joint of the antennae visible, short, cylindrical. Tibio-tarsus of the anterior telopod with sulcated knobs (stridulating organs). Praefemur of anterior telopod with one or several longitudinal keels *Globotharium* Bröl.

- 3b. Seventh joint of antenna only a disk on the tip of the sixth joint. Tibio-tarsus of anterior telopod without stridulating organs. Praefemur of anterior telopod with rectangular area of several keels . . . *Sphaeromimus* S. et Z.
- 2b. Praefemur of anterior telopod without stridulating organs (keels, etc.) . . . 4.
- 4a. Praefemur of anterior telopod with long internal prolongation, the immovable finger of the pincer. Seventh joint of antennae short, cylindrical. Antennae with four sensitive cones *Cyliosoma* Poc.
- 4b. Praefemur of anterior telopod without large process; the immovable finger is a femoral prolongation 5.
- 5a. Vulva consisting of four pieces, the proximal and distal halves being both divided into two pieces *Heligmasoma* Chamb.
- 5b. Vulva consisting of two or three pieces, one half (the operculum or the proximal half) or both halves being undivided 6.
- 6a. The operculum of the vulva divided, the proximal half not divided *Arthrosphaera* Poc.
- 6b. The operculum not divided 7.
- 7a. The shield anteriorly nearly vertical. The anterior half of tergites 2-12 with scattered small spines directed backwards . . . *Borneopoeus* Verh.
- 7b. Shield without such anterior declivity. Tergites without spines . . . 8.
- 8a. The femoral process of the posterior telopod strongly clubbed. Tibia and tarsus of posterior telopod separated. No stridulating organs. Antennae with numerous sensitive cones *Sphaerobelum* Verh.
- 8b. The femoral process of the posterior telopod not clubbed 9.
- 9a. Seventh joint of antenna short, cylindrical. Vulva consisting of three pieces, the proximal half being bipartite 10.
- 10a. The internal shell of the vulva much smaller than the external shell. Anterior telopod without stridulating organs. The tibio-tarsus undivided (Australia) *Procyliosoma* Silv.
- 10b. The internal shell of the vulva nearly as large as the external shell. Anterior telopod with rasping-knobs on the tibia; tibia and tarsus separated (South Africa) *Kylindotherium* Att.
- 9b. The seventh joint of antenna a disk on the tip of the sixth joint, bearing the sensitive cones. Vulva consisting of two pieces *Bothrobelum* Verh., *Castanotherium* Poc., *Tonkinobelum* Verh., *Sphaeropoeus* Bröl.

Gen. SPHAEROTHERIUM Brandt.

1833. *Sphaerotherium* Brandt, Bull. Soc. Nat. Moscou, vi, p. 198.
1886. *Sphaerotherium* Bourne, Journ. Linn. Soc., xix, p. 161.
1902. *Bournellum* Saussure, Zehntner, Grandidier, Madagascar, pp. 19, 20.

The species of *Sphaerotherium* seem to be very uniform at the first glance, and this impression is accentuated by a superficial study of the telopods, but on further investigation they prove to offer an abundance of good characters. In the Oniscomorpha the distinction between the species, genera, etc., is not made so preponderatingly on

the characters of the telopods as it is on the gonopods in the Proterandria; we have to make use of a large number of other characters such as the following:—

1. *Antennae*.—The number of sensitive cones on the last (eighth) joint varies: some species have four cones, some species more than four.

2. *Shield*.—The second tergite (shield—"Brustschild" in German) of the *Sphaerotheridae* is a simple tergite, as Verhoeff has demonstrated, in contrast to the corresponding plate of the *Glomeridia*, which is formed from a fusion of two tergites. Verhoeff calls the shield of the *Glomeridia* a bisyntergite, because he maintains that all the somites of the *Diplopoda*, including the first four, are double-somites like the fifth and following somites. I do not agree with this view; I believe that the first somites of all the *Diplopoda* are simple, bearing one pair of legs (or none), and that therefore also the shield of the *Glomeridia* is composed of two simple somites. Here, in the *Sphaerotheridae*, the shield belongs, as aforesaid, to one simple somite. Several parts of this shield offer good characters for the systematist. The surface is separated by a small furrow from the fine thickened border in the middle of the fore part. This furrow begins to be enlarged behind the lateral corners of the collum and becomes more or less expanded like the brim of a hat, and is therefore called the brim of the shield. When well developed the brim is always covered with hairs, while the adjacent parts are naked. The surface of the shield, generally much raised in comparison with the brim, is connected with it by a declivity. This declivity is steeper in the fore part and more sloping in the posterior part of the sides. It is always smooth and shining, even when the surface of the shield is covered with punctuation, wrinkles, and hairs. It often bears a small number of oblique low keels; the upper end of these keels may be connected by a fine rim running round the side of the raised surface. The brim may disappear or not be developed, when the declivity ends close to the marginal border. The width of the brim is often used in the key; the width being always measured in the antero-lateral part, where differences are most distinct.

3. *Tergites*.—The surface of the tergites shows two kinds of punctuation: (a) very small punctures, the openings of little canals perforating the chitin, found not only on the tergites, but in nearly all parts of the chitin and being probably the openings of unicellular hypodermal glands. They are found in conjunction with the second kind: (b) much larger punctures, also the openings of canals containing one nerve and bearing a little hair or bristle. I have called this kind of

punctuation *setiferous* punctuation. The hairs are generally minute and difficult to see; sometimes, as in *S. dorsale*, *S. subdorsale*, they are larger and the surface resembles fur. The hairs and larger punctures are completely wanting in *S. rotundatum*, *S. tenuitarse*, *S. kitharistes* (and ? *dinogonum* Silv.). In these species the tergites are very densely covered by the small punctures.

The anterior border of the tergites, the under side of the posterior margin, and the membrane connecting adjacent somites offer some important characters. The surface of the tergite slopes, in the fore part, down to a little furrow bounded in front by a small rim; the surface of this may bear little round protuberances like pearls, arranged in one row or in several rows; we then say that the anterior border of the tergite is beaded. From this edge the anterior border slopes again to a second rim; the membrane connecting two somites, the intersegmental membrane, is attached to this second edge; the other edge of the membrane is attached at some distance from the posterior margin on the under side of the preceding somite.

The intersegmental membrane has three kinds of protuberances: (a) dark cones (fig. 81 c), pointed or blunt, being only thickenings of the membrane and immovable; (b) movably mounted hairs or bristles (fig. 81 b), generally dispersed, rarely dense (*S. dorsale*, *S. subdorsale*), or wanting (*S. kitharistes*); (c) little hairy points (fig. 81 a) of microscopical size, springing from a relatively large pore. The anterior margin is not beaded in *S. giganteum*, *punctulatum*, *kitharistes*, *spinatum*, *modestum*; indistinctly beaded in *S. dicrothrix*, beaded in the other species.

The under side of the tergites bears a ridge at some distance from the posterior margin and parallel to it (fig. 51 a); the surface of this ridge often has one row of longitudinal callosities, the marginal callosities (fig. 82 w). Close behind these callosities the marginal bristles (fig. 51) are inserted in one or several rows; sometimes the bristles are inserted partly in the sinus between the callosities. The base of each bristle is surrounded by a ring, higher in front. The bristles are generally simple; in *S. dicrothrix* some of them are forked, in *S. rotundatum* they are pennate, and in *S. civicum* they have little short lateral teeth. The sides of the tergites are narrowed. Their anterior part is covered by the preceding tergite and its surface generally bears oblique rounded wrinkles. The under surface of the side is hollowed out in the posterior part for the reception of the following tergite, the cavity being bounded in front by a sharp edge. The anterior part of the under surface of the sides sometimes bears

a more or less distinct, dark-coloured longitudinal keel. In several species tergites 2-12 have a somewhat raised part in the middle line, broader in front, narrowing and disappearing after the middle—the *median keel*. It is always very smooth and shining, more striking on account of its smoothness than of its height.

4. *Pygidium*.—The pygidium of the ♂ is sometimes different from that of the ♀; it may be impressed in the middle, bear a longitudinal densely hairy stripe, or a little knob on the posterior border; or the margin may be raised like that of a bell.

5. *Legs*.—The distal margin of the coxa in some species is oblique and the lateral border steep, while in other species the lateral border of the coxa projects more or less as a rounded lobe, sometimes reaching beyond the distal margin of the coxa; this lobe in other species is directed laterally, and is more or less pointed and conical. The second pair of legs of the ♀ has some special characteristics: the coxa often has a protuberance on the lateral border, a cone or a lobe; in these cases the remaining legs have also a lateral lobe, but some species have no protuberance on the second leg of the ♀, while the remaining legs have a lobe, as in *S. spinatum*, *punctulatum*, *eremita*, *compressum*. The coxae of the second leg and of the remaining legs of the ♀ have one lateral lobe in *S. giganteum*, *cinctellum*, *dicrothrix*, *solitarium*, *modestum*; no lateral lobe or protuberance on any of the legs in *S. tuberosum*, *commune*, *rotundatum*, *dorsaloide*, *kitharistes*, *tenuitarse*, *dorsale*. The coxa is always covered with long hairs and generally also with some short spines, especially on the lateral border near the base and on the outer lobe. The third joint of the legs sometimes shows a finely serrulate longitudinal crest or edge. The fifth joint has one or two spines above near the claw in *S. rotundatum*, *tenuitarse*, *spinatum*, and *kitharistes*. In these species (with the exception of *S. spinatum*) the setiferous punctures on the tergites are wanting; the tergites are, on the contrary, densely covered with little punctures—the other kind of punctuation. Naked tergites are found also in *S. dinogonum*, which belongs to a different group with more than four sense cones on the antennae and without a spine on the fifth joint of the legs. The last joint of the legs varies in being longer and more slender or shorter and broader, the under side protruding, but these differences are but small and of no practical value. The last joint of the second leg of the ♀ is generally not spined above; only in *S. subdorsale* is there one spine. On the under side this joint has one spine in *S. spinatum* and *dicrothrix*, one or two spines in *solitarium* and *modestum*, three spines in *punctulatum*, four spines in

rotundatum, *tenuitarse*, *tuberosum*, *commune*, *cinctellum*, *giganteum*, *compressum*, *eremita*; six spines in *dorsaloide*, eight spines in *subdorsale*.

The vulva is composed of three pieces, two proximal, the "internal shell" and the "external shell" (*valve interne et valve externe*, Brölemann), and one distal, the operculum, the form of the distal piece varying.* It is broadly rounded and but little pubescent in *S. giganteum*, *commune*, *tuberosum*, *dorsaloide*, *subdorsale*, *compressum*, *cinctellum*, *dorsale*, *solitarium*, *eremita*, *kitharistes*; broadly rounded and densely covered with hairs in *spinatum*. It is slender and triangular and sparsely pubescent in *punctulatum*, *dicrothrix*, *modestum*, *convexitare*, *granulatum*; lengthened and rod-like in *tenuitarse* and *rotundatum*. The operculum is never bilobed as in *Globotherium*.

6. *Telopods*.—The anterior telopods consist of a syncoxite and telopodites. The syncoxite shows in the median line more or less distinctly the suture between the two coxae; this suture is as a rule only visible in the basal half. The syncoxite is never covered with hairs, and it bears the two telopodites; on the oral side (and only on this side) we see one condyle. The telopodite consists of three or four joints: the femur, tibia, and the 1- or 2-jointed tarsus. Hitherto the tarsus of *Sphaerotherium* has been generally described as 1-jointed, but in some species it is 2-jointed, the suture between the two joints still being visible. The condition where both joints are fused is secondary. The first joint of the telopodite, the femur, is nearly cylindrical and bears the second joint. The second joint, or tibia, has a lappet-shaped process on the aboral or median side, covered more or less distinctly with little papillae. The corresponding half of this stridulating organ consists of little ridged papillae on the tarsus; the majority of these papillae belong to the proximal tarsal joint and are arranged in a semicircle. The distal joint of the tarsus, or if the tarsus is coalescent, the corresponding part of the single joint, bears sometimes several little ridged papillae as described and 2-4 strong short spines, one or two black blunt knobs, especially well developed in *S. dorsale*. The tarsus is distinctly 2-jointed in *rotundatum*, *punctulatum*, *tenuitarse*.

The posterior telopods consist of syncoxite and telopodites. The syncoxite (fig. 48 *sc.*) shows no suture between the coxae. On the oral side its base is arched, on the aboral side it becomes flatter and flatter, passing into the intersegmental membrane between anal plate and syncoxite. The syncoxite bears two processes; in front on the oral side a pair of little horns (fig. 48 *sh.*) and behind a pair of dorso-ventrally

* See Brölemann, Bull. Soc. Zool. France, xlvii, p. 228.

flattened lobes, the bristle-lobes (fig. 48 *ll*). The little horns are covered with very fine and short hairs; they are narrowed towards the tip, but the tip itself is sometimes enlarged like a trumpet. The length of the horns compared with that of the bristle-lobes can be used systematically. Generally the horns are longer than the lobes, but the reverse may be the case. This relation, being dependent on the position of the preparation under the microscope, must be used with caution. The telopodite consists of femur, tibia, and tarsus, the last sometimes showing traces of two joints. The first joint, the femur (fig. 48 *F*) has no peculiarities; it is hairless. The second joint, *i.e.* the tibia, bears on the lateral side the main part of the stridulating organs; a cushion-shaped swelling covered with transverse ridges separated by rounded furrows. The ridges are visible especially on the aboral side; only the ends of them run on to the oral side. The lateral margin of the tibia is generally more prominent than the lateral margin of the tarsus, forming thus a kind of step. On the median side the tibia has a long and strong process, forming together with the tarsus a pair of pincers. This process has, on the side turned towards the tarsus, an oblong spot covered with thin, membrane-like chitin. Out of this opening rise one or two soft finger-shaped or conical processes. Generally there are two (*S. cinctellum*, *dorsaloide*, *punctulatum*, *tenuitarse*, *spinatum*, *subdorsale*, *commune*). One process only is present in *S. giganteum*, *rotundatum*, *kitharistes*, *civicum*, *dicrothrix*. In *S. dorsale* the single process is not soft, but firm like the adjacent chitin. I could not detect such processes in *S. compressum* and *tuberosum*, but as the material was limited and not too well preserved, these processes will perhaps be found in these species also. They seem liable in some degree to change their aspect. The surface turned towards the tarsus is covered with hairs and has one row of little tubercles opposed to the tubercles of the tarsus (the fourth kind of stridulating organ). The outside of the tibia is sometimes covered with hairs, sometimes naked. The tarsus bears on the inner side (which is turned towards the process of the tibia) one soft, triangular white lappet beset sometimes with one or several small bristles, or these bristles may be based on a little cushion beside the lappet. The lappet is wanting in *S. dorsale* and *subdorsale*. Sometimes (in *S. compressum*) there is found a second similar lappet distal to the usual one. In some species (*S. punctulatum*, *tenuitarse*, *civicum*, *dicrothrix*) the primitive condition of two joints is indicated by a weak suture. On the aboral side the tarsus bears one longitudinal row of furrowed knobs, the stridulating organ IV. mentioned above.

The following characters are less important for the distinction of the species than of general interest.

The shape and the component parts of the gnathochilarium are known well enough, but their interpretation is very controversial. In *Sphaerotherium* the large plate occupying the largest portion of the whole gnathochilarium is solidly connected with a little basal plate, confined to the hypostoma. The basal plate and the large central plate are connected by a dark-yellow hairless zone; the connection is rigid, sutures are not visible, and the limits between this connecting zone and the two connected parts are made distinct only by the colour and the bareness of the connecting zone. It seems that in other *Sphaerotheriidae* the basal plate is freer; the drawings of von Rath, Silvestri, and Verhoeff lead us to this conclusion. This basal plate is interpreted by von Rath and Verhoeff as the mentum, by Silvestri as the inframaxillare. I interpret it also as the mentum. The large main plate is declared by von Rath to be the coalescent product of the promentum and the two lamellae linguales; by Silvestri it is regarded as the "infrabasilare," by Verhoeff as the "lamellocardines," i.e. the product of coalesced lamellae linguales with hypothetical large cardines: a very remarkable multiplicity of views. I look upon this plate as the coalesced lamellae linguales. This lamella lingualis bears two papilla-caps ("Zäpfchen-kappen," Verhoeff) and the two stipites. I was led to this interpretation by the conditions as found in a newly examined *Glomeridesmus*. The Limacomorpha in some respects connect the Oniscomorpha sens. strict. and the Helminthomorpha, as regards the gnathochilarium. In *Glomeridesmus* we find adjacent to the hypostoma the mentum completely separated from the large lamella lingualis; the stipites are nearly connected with the mentum, separated from it only by a short lappet of the lamella lingualis. On the distal front of the lamella lingualis are two small but distinct lappets. The conditions being very similar in the *Sphaerotheriidae*, here also the large plate in question is the product of coalescent lamellae linguales. The *Sphaerotheriidae* are in most respects the continuation of the Limacomorpha: the mentum, entirely free in *Glomeridesmus*, is coalescent with the lamella lingualis in *Sphaerotherium*. The stipites, nearly touching the mentum in the former, are widely separated from it in the latter. Furthermore, if we did not know *Glomeridesmus*, it would be very difficult to believe the truth of Verhoeff's explanation; the lamellae linguales and cardines being of enormous size and fused completely without any trace of a median suture.

The legs of the *Sphaerotheridae* are treated in detail by Verhoeff in the *Diplop. Deutschlands*. The coxae of the first and second pairs are closely contiguous, but they are joined only by a small basal bridge. The last joint of the first to the third pair is not spined above, and the number of spines on the under side of the first and second pairs is less, being three or four. The penis, with the opening of the *vas deferens*, lies in a rounded cavity on the aboral side of the second coxa. It is a little rounded stump with a transversely ovate opening.

Distribution.—The genus, sens. strict. as taken here, seems to be confined to South Africa, where it occurs abundantly in the Cape Province and the Transvaal; three species are found in Portuguese East Africa—two in Lourenço Marques, and one (*S. kitharistes*) in Macequece.

Synopsis of the Species of Sphaerotherium.

- 1a. Antenna with four sense cones 2.
- 2a. Fifth joint of legs with 1-2 spines above 3.
- 3a. Shield, tergites, and pygidium with setiferous pits. Tergites with marginal callosities. ♀ vulva broadly rounded, densely covered with hairs. Last joint of the second leg of ♀ with one spine below. The coxae of the legs with projecting lobe on the outside (1) *spinatum* Silv.
- 3b. Dorsum without setiferous pits. Tergites without marginal callosities; distal piece of vulva slender, pointed or rounded, partly covered with hairs. Last joint of second leg of ♀ with 3-4 spines below. Coxae without projecting lobe on the outside 4.
- 4a. The legs with peculiar sense organs (little round cavities with a sensitive cone); marginal bristles of the tergites with lateral branched spines
(2) *rotundatum* Br.
- 4b. Legs without these sense organs. Marginal bristles simple 5.
- 5a. Pygidium without median keel. The brim of the shield broad; distal piece of vulva long, rod-like. Tarsus of anterior gonopod 2-jointed. Process of second joint of the telopodite of posterior telopods with two finger-like lobes. Intersegmental membrane with bristles. Anterior border of the tergites beaded (3) *tenuitarse* Silv.
- 5b. Pygidium with a low keel in the posterior half. Brim of shield indistinct. Distal piece of vulva broader, rounded. Tarsus of the anterior telopod not divided. Process of the second joint of the telopodite of the posterior telopod with one finger-like lobe. Intersegmental membrane without bristles. Anterior border of tergites not beaded (4) *kitharistes* n. sp.
- 2b. Fifth joint of legs not spined above 6.
- 6a. All tergites without a median keel 7.
- 7a. Surface of the pygidium, especially in the middle, densely granulated
(5) *granulatum* Poc.
- 7b. Surface of the pygidium not granulated 8.
- 8a. The lateral lobes of the shield projecting more backwardly than in other species. The distal piece of the vulva sharp, triangular
(6) *convexitarsum* Silv.

- 8b. The lateral lobes of the shield normal; distal piece of vulva broadly rounded 9.
- 9a. Pygidium of ♂ uniformly high, without impression or hairy stripe 10.
- 10a. Brim of the shield very broad; the sides of the tergites without longitudinal keels on the under side (7) *commune* n. sp.
- 10b. Brim of shield narrow. Sides of tergites with longitudinal keels below 11.
- 11a. Operculum broadly rounded. Coxa and praefemur beset with conical spines (8) *weberi* Silv.
- 11b. Operculum pointed. Coxa and praefemur without conical spines (9) *millepunctatum* n. sp.
- 9b. Pygidium of ♂ impressed 12.
- 12a. Outer side of coxa of second leg of ♀ not projecting. The process of the second joint of the telopodite of posterior telopod without finger-like lobes 13.
- 13a. Pygidium almost without setiferous pits and without hairy stripe. Coxa rounded laterally, not projecting (10) *tuberosum* n. sp.
- 13b. Pygidium with dispersed setiferous pits, the ♂ with a longitudinal, dense, hairy stripe in the posterior half. Coxa with rounded projecting lobe on the outside (11) *trichopygium* Att.
- 12b. Coxa of second leg of ♀ with laterally projecting lobe. (Second joint of telopodite not known) 14.
- 14a. Brim of the shield broad; distal piece of vulva longer and narrow (12) *intermedium*, Silv.
- 14b. Brim of the shield narrow. Distal piece of vulva broad, rounded (13) *submite* Silv.
- 6b. Tergites 3-12 with median keel (a smooth, shining, and slightly raised strip) 15.
- 15a. Coxa of second leg of ♀ with a protuberance on the lateral margin 16.
- 16a. Coxa of the remaining legs with rounded lobe on the outside surpassing or at least reaching the distal margin. Last joint of the legs swollen on the under side. Marginal bristles arranged in a zone consisting of several rows. Pygidium of ♂ bearing a little knob in the middle of the posterior border (14) *einctellum* Silv.
- 16b. Coxae of the legs declivous from the distal margin to the base on the outside, with a weak protuberance in the middle of the outer surface. Last joint of legs more slender, not strongly vaulted on the under side. Marginal bristles arranged in one single row. Only a low protuberance on the posterior border of the pygidium of the ♂ (15) *plagiarium* Silv.
- 15b. Coxa of second leg of ♀ without protuberance on the lateral margin 17.
- 17a. Coxa of the remaining legs with rounded lobe on the outer surface, extending beyond the distal margin. Third joint of the legs without denticulate edge. The hairs of the dorsum minute (16) *ancillare* n. sp.
- 17b. Coxae without projecting lobe on the outer surface. Third joint of the legs with a fine, denticulate edge. The hairs of the dorsum longer, like fur (17) *dorsaloide* Silv.
- 1b. Antenna with more than four sense cones 18.
- 18a. Tergites, beginning from the third, with median keel 19.
- 19a. Surface of tergites without hairs; coxa of second leg of ♀ with lateral cone (18) *dinogonum* Silv.

- 19*b*. Surface of tergites with setiferous pits. Coxa of second leg of ♀ without lateral cone. Hairs of dorsum relatively long. Tarsus of posterior telopod without triangular lobe. Intersegmental membrane densely covered with hairs, intermixed with dark cones 20.
- 20*a*. Terminal joint of second leg of ♀ not spined above. The impression on the pygidium is bounded above by a rounded protuberance. Process of second joint of telopodite of posterior telopod with one rigid blunt tooth
(19) *dorsale* Gerv.
- 20*b*. Terminal joint of second leg of ♀ with one spine above near the claw. The impression on the pygidium dies out above gradually. Process of second telopodite of posterior telopod with two soft triangular lobes
(20) *subdorsale* Silv.
- 18*b*. All tergites without median keel 21.
- 21*a*. Brim of shield broad 22.
- 22*a*. Lobe on the outer side of the coxae broadly rounded 23.
- 23*a*. Process of second telopodite of posterior telopods with large blunt teeth.
Pygidium of ♂ with hairy median spot (21) *boerium* Silv.
- 23*b*. Process of second telopodite not toothed. Pygidium without hairy spot
(22) *apicale* Silv.
- 22*b*. Lobe on the outer side of the coxae conical. 24.
- 24*a*. Coxa of second leg of ♀ without lateral lobe (23) *eremita* n. sp.
- 24*b*. Coxa of second leg of ♀ with large lateral lobe 25.
- 25*a*. No keels on the declivity of the shield. The setiferous pits of the pygidium fine and dense (24) *modestum* n. sp.
- 25*b*. Small keels present on the declivity of the shield. The setiferous pits of the pygidium large and scattered (25) *coniferum* Silv.
- (26) *permodestum* Silv.
- 21*b*. Brim of shield narrow 26.
- 26*a*. Surface of shield without setiferous pits. Margin of the pygidium of the ♂ not raised. Anterior border of the tergites beaded. Smaller species, ca. 9 mm. wide 27.
- 27*a*. No marginal callosities on the under side of the tergites; marginal bristles with lateral points. Lobe on outer side of the coxa rounded (27) *civicum* n. sp.
- 27*b*. Marginal callosities present. Marginal bristles without lateral spines, sometimes forked. Lobe on outer side of the coxa pointed, conical, or with several points 28.
- 28*a*. Marginal bristles partly forked, arranged in one row. Lobe on outer side of the coxa with several points (28) *dicrothrix* n. sp.
- 28*b*. Marginal bristles simple, arranged in several rows. Lobe on outer side of the coxa simple, conical (29) *solitarium* n. sp.
- 26*b*. Shield with setiferous pits. The margin of the pygidium of the ♂ expanded like that of a bell. Anterior border of the tergites not beaded. Very large species, up to 32 mm. wide 29.
- 29*a*. The thickened margin of the pygidium is cut off obliquely so that the edge is sharp. No lateral keel at the sides of the pygidium on the under side. No marginal callosities of the tergites. Tarsi of anterior and posterior telopods 2-jointed. Second joint of the telopodite of the posterior telopod with two finger-like lobes. Coxa of second leg of ♀ without teeth on the lateral margin. Distal piece of vulva slender, triangular (30) *punctulatum*, Brandt.

- 29b. The thickened margin of the pygidium rounded, without a sharp edge. One dark lateral callosity of the pygidium on the under side. Marginal callosities present on tergites. Tarsi of anterior and posterior telopods simple. Second joint of telopodite of posterior telopods with one finger-like lobe. On the outer side of the coxa of the second leg of ♀ one strong tooth. Distal piece of vulva broadly rounded (31) *giganteum* Por.

88. (1) *Sphaerotherium spinatum* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 187.

(Pl. I, figs. 8, 9, 10.)

Colour olivaceous. Width, ♂ 11·5 mm.; ♀ 15 mm.

Head densely and roughly punctate and pubescent on the fore part, less so on the remainder. Collum with dispersed setiferous pits. Shield with the brim broad, hairy, the declivity without or with faint keels. The pits of the surface large, the hairs minute. Tergites with the setiferous pits dense, moderately large, dispersed on the posterior border. Anterior border sharp, not beaded, the excavation behind the border with weak longitudinal furrows, the first zone of the surface with very dense and small punctures, smaller than the pits of the open part. The marginal bristles (fig. 8) arranged in an irregular zone of several rows, extending far beyond the posterior margin; before them one transverse row of oval black callosities. Intersegmental membrane with dispersed long hairs, thick conical protuberances and numerous minute pointed hairs. Part of the sides covered with corrugated wrinkles, no keel on the under side. Pygidium densely punctate, the hairs minute, no peculiar sculpture in the ♂. No keel on the under side laterally. The ♂ has large granular spots at the sides which are densely covered with hair.

Coxae with a large, rounded lobe on the outer side, beset with some black spines and numerous long hairs. Basal part of the coxa also spined. Fifth joint with one strong spine above. Second pair of legs of ♀ with the coxa densely covered with hairs laterally, and bearing some spines but no lateral lobe; the inner side is also spined. The fifth joint not spined above; the last joint has one spine below. The vulva is much shorter than in *tenuitarse* and *rotundatum*, broadly rounded, densely covered with long hairs. (The drawing of Silvestri is not correct). Gonopods (figs. 9, 10). The outer side of the tibia of the posterior gonopods projecting, forming a distinct step with the tarsus, not hairy; the inner side moderately hairy to the tip of the process. The process has two white lappets. The tarsus has one

triangular lappet bearing two spines, and two small and one larger spine below the tip; on the inner side one row of farrowed tubercles (Silvestri says from the tibial process "inermis"). The pincers, taken as a whole, short and clumsy.

Koega, Uitenhage Div. (7410); Dunbrody, on the Sundays River, Uitenhage Div. (7377); Graaff-Reinet (B. 2226), Port Elizabeth (Silv.), Cape.

89. (2) *Sphaerotherium rotundatum* Brandt.

1872. *Sphaerotherium rotundatum* Porat, Öfvers. Vet. Ak. Förh., v, p. 6.

1872. *Sphaerotherium viride* Porat, Öfvers. Vet. Ak. Förh., v, p. 6.

1872. *Sphaerotherium pubescens*, Porat, Öfvers. Vet. Ak. Förh., v, p. 7.

1910. *Sphaerotherium rotundatum* Silvestri, Boll. Lab. Zool. Portici, iv, p. 184.

(Pl. I, figs. 11-14.)

Silvestri has examined the type-specimens of Porat, therefore the identity of *rotundatum* Porat and *rotundatum* Silvestri is undoubted. Whether *rotundatum* Brandt and Porat are identical is impossible to decide. The descriptions of both are useless in the modern sense. The species is fixed now in the sense of Silvestri, to whom I also leave the responsibility concerning the synonymy of *viride* and *pubescens*.

Shield with the brim moderately broad, pubescent; the declivity broad and the keels upon it distinct. Along the anterior border of the collum one row of setiferous pits, the rest smooth. Surface of shield and tergites densely covered with little punctures, but completely lacking pits and hairs. The sides of the tergites and the pygidium with dark-coloured longitudinal keels on the under side. Anterior margin of the tergites distinctly beaded. The under side of the posterior border of the tergites is peculiar; the intersegmental membrane is green, and a broad border behind the line where it is attached is reddish. The marginal bristles are pennate (fig. 14); they are of unequal length and form little groups, two or three longer ones converging with one or more shorter in the centre, but the arrangement is not regular. Behind the bristles there is a dark-coloured band, but no callosities. Behind this dark oval zone, sharply defined spots are visible of an unknown nature. Pygidium without peculiarities.

The coxae have no projecting lobe on the outer surface; the fifth joint with two strong spines above. Second leg of ♀: coxa without any protuberance on the outer side; fifth joint not spined above, last joint with four spines below. The vulva resembling that of *tenuitarse*, the distal piece long, slender, sparsely covered with hairs (fig. 13). The peculiar sense organs in the legs are described by Silvestri; little round cavities opening by a small aperture and each bearing one sensitive hair, which does not project out of the aperture. These sense organs make the species easily distinguishable. Gonopods (figs. 11, 12): the syncoxite of the anterior gonopods is coalescent, no suture being visible; the tibia is swollen on the outer side. The tarsus is incompletely 2-jointed, the suture visible only from the aboral side. The process of the tibia is slender, the stridulating organ weak. The second tarsal joint bears some conical spines (fig. 12). The horns of the syncoxite of the posterior gonopods extend beyond the bristly lobe by a little. The pincers are relatively slender. The tibial process with only one finger-shaped process. The inner side of the tibia pubescent, the outer side naked. The tarsus is indistinctly 2-jointed.

Natal.—Pietermaritzburg (B. 3411); Krantz kop (B. 991); Durban (Silvestri). *Transvaal*.—Johannesburg (7311). *Cape Province*.—Hogsback, Amatola Mts. (B. 806); Knysna (B. 5258); Kentani, Transkei (A. 2442).

90. (3) *Sphaerotherium tenuitarse* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 186.

(Pl. I, figs. 15–18.)

Colour chestnut, the posterior border of tergites blackish. Width, ♂ 6–8 mm.; ♀ 8 mm.

Head-plate with the usual coarse setiferous pits. Collum with one row of pits along the anterior border. The rest smooth. Shield with the brim broad, pubescent, eight keels on the declivity. The surface without setiferous pits, but densely covered with minute punctures. The tergites not pubescent like the shield, but with the same minute punctuation. The marginal bristles (fig. 17) arranged in one row, simple (not pennate as in *S. rotundatum*). No callosities in the dark-coloured zone in front of the bristles. Intersegmental membrane with dark cones, dispersed hairs, and minute hair-points. Anterior border of the tergites finely beaded, the groove behind the

beaded border smooth, the raised surface at the sides with some short oblique striae. On the under surface of the sides of the tergites and of the pygidium one dark-coloured keel. Pygidium simply rounded, without impressions or other peculiarities.

The coxae of the legs with a rounded, but not projecting, pubescent shoulder on the outer side, no spines; fifth joint with one or two strong spines above. Second leg of ♀ (fig. 18): coxa with a small, scarcely visible, protuberance on the outer side; on the second and third joints a glandular mass. The fifth joint not spined above, the last joint with four spines below. The distal piece of the vulva is long, slender, and rod-shaped. (The drawing of Silvestri is not correct.) The second and third joints of the posterior legs of the ♂ bear shiny papillae on the under side. The syncoxite of the anterior gonopods is coalescent. The tibia is swollen on the outer side. The process is pointed, in contrast to *spinatum*, where it is rounded. The tarsus is distinctly 2-jointed. The last joint bears two teeth (fig. 16). The horn of the syncoxite of the posterior gonopods as long as the bristly lobe, enlarged at the top. The pincers somewhat more slender than in *S. spinatum*, otherwise similar. The tibial process with two finger-shaped lobes, the hairs denser than in *S. spinatum*. The tip of the tarsus is indistinctly separated by a suture; the lappet of the tarsus bears one little spine (fig. 15).

Natal.—Krantzkop (B. 3395). *Transvaal*.—Venterstroom (13714); Louis Trichardt (B. 4062); 20 miles from Pietersburg, Zoutpansberg Distr. (7489). *Cape Province*.—Doornek, Zuurberg Range, Alexandria Div. (7414); Swellendam (7749); Knysna, Cape Colony (Silv.).

91. (4) *Sphaerotherium kitharistes* n. sp.

(Pl. I, figs. 19-22.)

Colour olivaceous; head, collum, shield, and a broad border of the tergites blackish-brown. ♂ width 7 mm.

Setiferous pits dense on the fore part, dispersed on the remaining part of the head-plate; four sensitive cones on antenna. Shield: the declivity begins immediately behind the small marginal furrow, there is therefore no brim present. In the furrow are some yellow hairs; on the declivity weak traces of keels. Tergites with dense minute punctures of microscopic size without setiferous pits. Anterior border of tergites not beaded. On the under surface of the sides and of the tergites dark-coloured longitudinal keels. The marginal bristles are arranged in one single row; they are simple and do not

reach the posterior margin. In the dark-coloured zone before the bristles no distinct callosities. On the intersegmental membrane dark cones and minute hair-points, but no bristles (fig. 21). The posterior part of the pygidium of the ♂ is weakly depressed on every side, so that the middle appears as a low rounded keel. The posterior border is not thickened; it is finely edged, the margin a little arched in the middle but not raised. The surface is the same as that of the tergites. On the under side two patches with little granules.

The outer side of the coxae of the legs declivous, without any lobe; the fifth joint with one spine above, the last joint with 5-6 large spines, relatively slender, not swollen on the under side. The under side of the second and third joints with some papillae (fig. 19). Second leg of ♀ (fig. 22): the coxa with no protuberance laterally, fifth joint not spined above. Last joint with three spines below. The vulva of the same shape as in *S. spinatum*, but less pubescent, nearly bare. The gonopods of the single ♂ are not intact; they resemble those of *S. rotundatum*, but the tarsus of the anterior gonopod is single-jointed. For the posterior gonopod, see fig. 20.

Macequece, Portuguese East Africa (B. 2241).

92. (5) *Sphaerotherium granulatum* Poc.

1895. Pocock, Ann. Mag. Nat. Hist., (6), xvi, p. 410.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 196.

The characteristic of this species, not represented in the collection of the Museum, seems to be the granulation of the pygidium. Shield with broad brim, the declivity bearing nine keels. Antenna with four sense cones. The coxae not projecting on the outer side. The fifth joint not spined above. The coxa of the second leg of ♀ without lateral protuberance. The distal piece of the vulva slender and triangular.

Width 7 mm.

Port Elizabeth, Cape.

93. (6) *Sphaerotherium convexitarsum* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 198.

In the tabular view Silvestri placed this species with those "tergiti ultimi superficies haud granulosa," and in the description he says: "Tergitum ultimum granulis perparvis et punctis parvis sparsis instructum." As the description contains only a few characters it is very difficult to recognise the species.

Port Elizabeth, Cape.

94. (7) *Sphaerotherium commune* n. sp.

(Pl. I, figs. 23-26 ; Pl. II, fig. 27.)

Colour blackish-brown or black, the broad posterior border reddish-brown. ♂ 5-7 mm. wide, ♂ up to 9.5 mm.

Four sensitive cones on the antenna. Setiferous pits dense on the fore part of the head, dispersed behind. Collum with one row of pits. The pits on the tergites relatively large and dense, the hairs minute. Shield with the brim very broad, pubescent; the declivity with three keels, the surface roughly punctate. Pygidium simply rounded, the border not raised, not thickened; the setiferous pits of two sizes, the larger ones scattered over the whole surface, the finer especially near the posterior margin. Anterior border of the tergites distinctly beaded, the strip close behind the anterior groove more densely punctate. Concealed part of the sides pubescent, but not visibly wrinkled. No keels on under side of lateral lobes. The marginal bristles arranged in one row, the longest projecting a little over the posterior margin. In front of them one row of short black callosities. Intersegmental membrane with dispersed bristles, short blunt cones, and numerous hair-points.

Coxae (fig. 23) rounded on the outer side, not projecting, bearing 2-3 spines, the fifth joint not spined above. The terminal claw curved, longer than the upper spine. Second pair of legs of ♀ (fig. 26): the coxa without protuberance on the outer side, pubescent, not spined. Terminal joint not spined above, four spines below. The distal piece of the vulva broader than long, obliquely cut, the angles rounded. Gonopods: the syncoxite of the anterior pair divided in the median line by a deep groove, the two halves connected only by a membrane. The femur with a group of long hairs on the inside. The tibia and tarsus with dispersed hairs. The stridulating organ typical (fig. 24). The horns of the second pair are bent outwards and project a little beyond the bristly lobes. The tips pointed, the whole inner side and the first two-thirds naked. The tibia not projecting on the outer side, the two forks of the pincers of equal length. The tibial process with two finger-shaped lobes. The tarsus indistinctly 2-jointed; the basal part of the tarsus with one triangular lappet, and one row of 15-16 stridulating knobs. The distal part bearing two or three little spines (figs. 25, 27).

Cape Province.—Venster Ravine, Caledon (7363), Caledon (14656), Ceres (7516), Swellendam (7341), Gordon's Bay, Stellenbosch (23394), Table Mt. (4038, 4090, B. 963), Montagu (B. 4111), Bredasdorp Div.

(7320), Kalk Bay Mt., Cape Peninsula (150119, 150098), Hottentots Holland Mts. between Steenbrass River and Gordon's Bay (7313), Graaff-Reinet (13464), Houw Hoek, Caledon (7345), Wagenaars Kraal, Victoria West Div. (7508), Mossel Bay (1652), Keurbosch Kraal River, Cedarbergen (7425), Gt. Winterhoek, Tulbagh (B. 2269, B. 2850).

95. (8) *Sphaerotherium weberi* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 194.
Table Mt., Cape Town (Silv.).

96. (9) *Sphaerotherium millepunctatum* n. sp.

(Pl. XXV, fig. 555; Pl. XXVI, figs. 556-559.)

Colour dark brown, nearly black, the pygidium lighter, olive-brown. Length 17 mm., width 8 mm. The tergites and the pygidium regularly, very densely, and finely punctate. On the anterior margin of the tergites one row of regular longitudinal ridges. The knobs on the under side near the posterior margin are closely united to a narrow dark zone, and the single knob becomes indistinct. Behind this zone one row of bristles not reaching the margin; in front of the zone scattered conical points (fig. 555). The pygidium of the ♂ is slightly bent upwards in the middle, in the ♀ it is regularly vaulted. On the under side laterally a dark-coloured longitudinal crest; the same crest on all tergites. The crest of the shield broad and pubescent; above the crest some fine transverse crests. The posterior border broadly rounded laterally, not projecting unusually far. Head-plate with dispersed, large, setiferous punctures. (The body not hairy.) Four sensitive cones on the antenna. The coxa of all legs (fig. 558) without lateral process; the tibia not spined above; the tarsus with $\frac{1}{4}$ (one spine above, seven spines below) spines. The terminal angle of the vulva (fig. 559) acute, the coxa of the second pair of legs of the ♀ without lateral process, the tarsus with abundant long bristles, with $\frac{9}{8}$ spines, without conical points. The rasp of the third telopodite joint of the anterior gonopod (fig. 557) composed of nine transverse knobs. On the last joint one little cone and three short spines and some long hairs. The process of the second joint with fine protuberances. The processes of the syncoxite of the posterior gonopod (fig. 556) densely and finely hairy, straight, not enlarged distally. The tarsus is separated by a suture and bears a little white lappet.

Masiene, Chai Chai, Portuguese E. Africa (5994).

97. (10) *Sphaerotherium tuberosum* n. sp.

(Pl. II, figs. 28, 29.)

Colour chestnut. Posterior border of tergites darker brown. Width, ♂ 6.5–7 mm, ♀ 9 mm.

Four sense cones on the antenna. Head-plate densely punctate in the fore part, sparsely so on the vertex. Collum with one row of setiferous pits along the anterior border. Shield with the brim broad, the declivity with some weak keels; at the sides of the upper surface some larger pits. Anterior half of the tergites with coarse and dense, posterior half with dispersed and fine, setiferous pits; sometimes only the last quarter of the tergites is less punctate. Longitudinal keels on the under side of the lateral lobes present, but indistinctly visible. Pygidium of ♂ has in the middle one low protuberance, rounded, and extending to three-quarters of length of pygidium, marked by shallow impressions at sides, but not in front. Surface of pygidium nearly naked and without punctures; only at the sides some small, scattered punctures. Underneath, one patch of little granules at each side, the rest pubescent. In the ♀ the protuberance is wanting. The marginal bristles are arranged in a zone of several irregular rows; most of the bristles do not project beyond the margin. In front of the bristles one row of little black rounded callosities of variable size. The bristles have very short lateral points in their distal half. Intersegmental membrane with dispersed cones, bristles, and numerous hair-points.

The coxae with rounded shoulder, beset with spines, but not projecting. Fifth joint not spined above, the terminal claw larger than the upper spine, with a little basal tooth (as is generally the case). Last joint with six spines below. Second pair of legs of ♀: the coxa without protuberance on the outer side, hairy but not spined; terminal joint not spined above, four spines below. Distal piece of the vulva broadly rounded, only the margins beset with hairs (fig. 29). Gonopods: tibia not swollen on the outer side, tarsus single-jointed, the stridulating organs typical. The syncoxite with a deep median groove. The horns of the syncoxite of the posterior gonopod are long and project far beyond the short, broad, round bristly lobes. The outer side of the tibia projecting but little. The tibial process pointed, somewhat shorter than the tarsus. I could not see any finger-shaped lobe. Tarsus with triangular lappet, a small lappet distal from the first, and one little spine. The stridulating knobs well developed, the tarsus 1-jointed (fig. 28).

Cape Peninsula (1510), Table Mt. above Camps Bay (150164), Cape ; Zoekmakaar, N. Transvaal (4061).

98. (11) *Sphaerotherium trichopygum* (Att.).

1907. *Bournellum trichopygum* Attems, Deutsche. Südpol. Exp., p. 424.

? 1910. *Sphaerotherium compressum* Silvestri, Boll. Lab. Zool. Portici, iv, p. 199.

(Pl. II, figs. 30, 31.)

Colour black, the anterior part of the tergites chestnut. Pygidium light chestnut. Width, ♂ 10–11·5 mm., ♀ 16·5 mm.; length, ♂ 28 mm., ♀ 34 mm.

Head-plate with coarse setiferous pits in front and scattered pits behind. Collum with a row of setiferous pits along the anterior margin. Shield with the brim broad, pubescent; the declivity with some keels, the surface punctate, more densely at the sides. The tergites coarsely punctate on the anterior three-quarters, the posterior quarter nearly smooth. On the under side of the lateral lobes a dark-coloured longitudinal keel. The same with the pygidium in the corresponding part. The marginal bristles are arranged in a zone of some irregular rows; they are simple and do not extend beyond the posterior margin. The callosities intrude a little on the zone of bristles (fig. 30). Intersegmental membrane with cones, bristles, and hair-points as usual. The anterior border of the tergites is beaded, the beads arranged in two rows. Pygidium of ♂ with the sides depressed; between the shallow, gradually disappearing depressions a low rounded median wedge, narrowed behind. On the median wedge in the posterior part a band of dense yellow bristles. The surface of the first third with fine punctuation, the rest nearly smooth; the margin of the pygidium not raised and not thickened. At the sides a patch of granules on the under side. In the female the depressions and the hairy band are wanting.

The coxae with a rounded lobe on the outer side, the lobe beset with many little spines and separated from the median part by a sinus, but scarcely projecting beyond the distal margin of the median part. Fifth joint not spined above. Praefemur of last leg of ♂ projecting, with a little lobe on the inner side, the femur swollen, the terminal joint the same, with eight spines. The terminal claw larger than the upper spine. The third joint of the legs with a short, indistinctly crenulate edge on the anterior side. Second leg of ♀: coxa without

lobe on the outer side, spined and pubescent, terminal joint not spined above, four spines below. The median suture of the anterior syncoxite of the gonopods partly visible. Tibia not swollen externally. The whole telopodite densely covered with hairs. The tibial process with small tubercles. The tarsus single-jointed, the stridulating organ well developed, consisting of 9+2 stridulating knobs. Two to three spines at the tip. The horns of the posterior syncoxite project far beyond the bristle-lobes, the tibia projecting a little on the outer side. The tibial process pointed, visibly shorter than the tarsus. I could see no finger-shaped lobes. The edge turned to the tarsus has blunt notches. The tarsus single-jointed, bearing 20 stridulating knobs in one row and one spine at the tip. Tibia and tarsus well covered with hairs (fig. 31).

Cape Province.—St. James, Cape Peninsula (B. 956, 7714); Krakadouw Pass, Cedarbergen (7553), Simonstown, Millers Point (Att.)

Trichopygum Att. 1907 is perhaps synonymous with *compressum* Silv. 1910. Silvestri says of his species: "tergitum ultimum . . . in carina media deplanata setis nonnullis brevioribus auctum." No description of the dense, hairy patch is given in his account, only the presumption that the two species are identical. Brandt and Porat say nothing of these pubescent parts in the papers cited by Silvestri, and we do not know why Silvestri supposed that his species was the same as that described by Brandt and Porat, nor why he revived these old descriptions which lack any detailed characters.

99. (12) *Sphaerotherium intermedium* Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 8.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 202.

Cape Town (Silv.).

100. (13) *Sphaerotherium submite* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 204.

Knysna (Silv.).

101. (14) *Sphaerotherium cinctellum* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 191.

(Pl. II, figs. 32-37.)

Colour black, posterior border of tergites yellow, contrasting strongly. Width, ♂ 15-16 mm.; ♀ up to 18.6 mm.

Head-plate as usual densely punctate in front, scattered punctures behind. Collum with scattered setiferous pits. The brim of the shield not broad, rather narrow, the declivity smooth, without keels. The surface with dense, coarse setiferous pits. Tergites densely covered with coarse setiferous pits, 3-13 with a median, smooth, low keel. On the under side a short, dark-coloured longitudinal keel at the sides. The marginal bristles are arranged in a zone of several rows; they are long, projecting far beyond the posterior margin; the callosities are of variable size and enter with their posterior end the zone of bristles (fig. 33). Anterior border beaded, the beads arranged in several irregular rows. Concealed part of the sides with corrugations and wrinkles. Pygidium with the whole surface densely covered with coarse pits each bearing one minute hair. Male pygidium has in the middle of the posterior border a short, thick, transverse callosity, densely covered with hairs on the upper side; in front of this callosity there is a shallow depression. On the under side the usual patches of granules. In the ♀ the callosities are wanting. At the sides on the under surface a little knob corresponding to the keels on the tergites.

Coxa (fig. 35) with rounded lobe beset with spines and long scattered hairs. On the base of the coxa numerous spines, the inner side densely covered with long hairs. Third joint with fine serrated edge. Last joint short, swollen on the under side (fig. 37). Second leg of ♀: on the outer side a large transverse conical lobe beset with long hairs and scattered spines; last joint not spined above, four spines below. Distal piece of the vulva moderately narrowed and rounded, pubescent at the base on the inner side (fig. 36). Gonopods: the anterior telopodite abundantly pubescent; tarsus with a hollowed-out lamella bearing eight stridulating organs; the distal part of the tarsus only with two little spines (fig. 34). The horns of the posterior syncoxite little shorter than the bristle-lobes. The outer side of the tibia projecting, forming a step with the tarsus; the tibial process with two white finger-shaped lobes. Tarsus pubescent only at the base, bearing one white, spineless, triangular lappet and two little spines on a small protuberance, and one row of 20 stridulating organs (fig. 32).

Cape Province.—Knysna (1552, B. 5259), Coldstream, Humansdorp (B. 5300, B. 5301), George (7388); Knysna (Silv.).

102. (15) *Sphaerotherium plagiarium* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 193.

(Pl. II, figs. 38-43.)

Four sensitive cones on the antenna. Shield with very broad brim, pubescent, the declivity without keels. The punctuation of the anterior half finer and denser than that of the posterior. The raised surface of the shield, the tergites, and pygidium densely covered with setiferous pits, the hairs relatively long, so that the dorsum appears fur-clad. Between the pits numerous little punctuations, the openings of the canals; the open part of the sides narrowed and pointed, the concealed part broad, covered with corrugations and wrinkles; longitudinal keels on the under surface. Tergites, beginning from the third, with smooth median keel. Anterior border of the tergites with a zone of several rows of little beads (fig. 38); the marginal bristles arranged in a single row visibly overlapping the margin; the callosities regular, relatively long and narrow. Intersegmental membrane with scattered bristles, cones, and numerous pointed hairs (fig. 39). Pygidium of ♂: in the posterior part a shallow, transverse depression, the margin slightly raised; in front of it a low transverse callosity passing gradually into the surrounding surface and separated from the margin by a furrow. On the under surface the two usual patches of granules, and at the sides a little keel.

Coxae (fig. 41) with the lateral margin where it passes into the distal margin declivous; in the middle a little knob beset with spines. The last joint fairly slender, not protruding on the under surface; eight spines. The claw larger than the upper spine, curved (fig. 40). Third joint with a sinuate edge (not sharply toothed). Last pair of legs of ♂ without peculiarities. Gonopods: the anterior telopodite (fig. 42) with scattered hairs, the tibia not protruding on the outer side. The stridulating apparatus of the tarsus well developed; the tarsus single-jointed, the first part with six stridulating organs and one spine, the second part with two stridulating organs and two spines. The horns of the posterior syncoxite visibly surpassing the bristlelobes, the tip not enlarged. Telopodite relatively sparsely pubescent, the tibial process with two finger-shaped lobes. Tarsus with one triangular lappet beset with two spinules, one low protuberance with two spines, and one row of 22 stridulating organs. The distal part of the tarsus separated off by a suture (fig. 43).

River Zonder End (5269), Cape; Knysna (Silv.).

103. (16) *Sphaerotherium ancillare* n. sp.

(Pl. II, figs. 44, 45.)

Colour of ♀ chestnut, the posterior border of the tergites blackish. Length 23 mm., width 10.5 mm.

Four sensitive cones on the antenna. Shield with the brim broad, pubescent, the declivity with six distinct keels. The surface with moderately dense and large punctuation, the hairs minute. The tergites more densely punctate in front than in the posterior part. The difference in the size of the pores is not remarkable; the hairs are minute and not easy to see. Lateral lobes of the same shape as in *plagiarium*; the free part narrowed and pointed, the covered part broad, with corrugations and wrinkles. On the under surface low longitudinal keels. Tergites 2-12 with a median keel, especially striking on account of its smoothness, but scarcely raised. Anterior border beaded, the beads arranged in one row or sometimes one or two incomplete rows as well as the regular first row. Marginal bristles in a single row, not overlapping the margin. The callosities short and rounded. Intersegmental membrane with bristles, cones, and hair-points. Pygidium of ♀: on each side of the posterior part a shallow depression, the middle is therefore raised, but very slightly; the margin not raised. (The ♂, when known, will perhaps show a stronger sculpture.)

Coxae (fig. 44) with broad, rounded lobe, spined and pubescent, overlapping the distal margin a little. Third joint without serrulate edge; last joint slender, six spines below. Second legs: coxae without lobe or protuberance on the outer side, last joint not spined above, four spines below. Distal piece of vulva broadly rounded, abundantly pubescent (fig. 45). ♂ not known.

Table Mt. above Klassenbosch (150158), Newlands (7693), Cape.

104. (17) *Sphaerotherium dorsaloide* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 189.

(Pl. II, figs. 46, 47.)

Colour olive or black, the posterior border reddish, similar to *cinctellum*. Most specimens are chestnut or blackish. (The colour of the specimens is obviously altered by being long preserved in bad alcohol; most species are similarly affected.) ♂, length 28 mm., width 14 mm.

Setiferous pits of the head scattered on the fore part as well as behind. Four sense cones on the antenna. Collum with a row of setiferous pits along the anterior border. Shield with the brim broad, pubescent; the declivity with or without weak keels. The surface coarsely and densely punctate and hairy. The tergites with coarse and dense pits up to the top of the lateral lobes, the pits visibly denser and finer in the anterior part. The hairs are not so long as in *dorsale*, but distinctly visible. On the under surface of the sides is a longitudinal keel, present also on the pygidium where it is relatively long and narrow. Tergites from the third onwards with a smooth median keel scarcely raised, but striking on account of its smoothness compared with the surrounding pubescent surface. On the anterior border an irregular zone of little beads. Marginal bristles arranged in one row, not reaching the margin. The callosities regularly arranged, black. Intersegmental membrane with scattered bristles, pointed cones, and numerous hair-points (fig. 46). The whole surface of the pygidium densely covered with punctures, though somewhat less densely than the tergites. In the ♂ the posterior median part a little depressed, the margin slightly raised like the edge of a bell. Under surface with the usual granules.

The outer side of the coxae (fig. 47) declivous, in the middle a rounded, spined, and pubescent protuberance. (No lobe overlapping the distal margin.) The last joint longer than in *S. cinctellum*, protruding on the under surface in the ♂; 9-12 strong spines. The claw curved, larger than the upper spine. The third joint of ♂ and ♀ with serrate edge. Second leg of ♀: no protuberance on the outer side; last joint not spined above, six spines below. Distal piece of vulva broadly rounded, the inner side pubescent. The gonopods similar to those of *S. cinctellum*. The horns of the posterior syncoxite overlap the bristle-lobe a little. The tarsus of the posterior gonopods single-jointed, its triangular lappet not spined. Tibial process with two finger-shaped lobes.

Cape Province.—Swellendam, in rotten wood (7340, 7749), Knysna (1554, 1553), River Zonder End (B. 5281), Hottentots Holland (7314), Newlands (B. 985), Mossel Bay (1651), Knysna (Silv.).

105. (18) *Sphaerotherium dinogonum* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 210.
Knysna (Silv.).

106. (19) *Sphaerotherium dorsale* Gerv.

1847. *Zephronia dorsalis*, Gervais, Ins.-Apt., iv, p. 79.
 1863. *Sphaerotherium retusum* Koch, Die Myriop., i, pl. xix, fig. 26.
 1872. *Sphaerotherium dorsale* Porat, Öfvers. Vet. Ak. Förh., v, p. 5.
 1886. *Sphaerotherium retusum* Bourne, Journ. Linn. Soc., xix, p. 161.
 1910. *Sphaerotherium dorsale* Silvestri, Boll. Lab. Zool. Portici, iv, p. 205.

(Pl. II, figs. 48-52.)

Colour chestnut, median keel of tergites black. ♀ width 16-17.5 mm.

Antenna with 7-20 sense cones. Head with coarse setiferous pits, denser in the fore part. Collum also densely punctate and pubescent. Shield with the brim broad, pubescent. The eight keels of the declivity rise from a fine border surrounding the sides of the raised surface. The surface punctate and pubescent. Tergites densely punctate and hairy. The hairs not long but relatively strong. From the third tergite onwards a smooth median keel, contrasting strongly with the surrounding hairy surface, evanescent behind the middle of the tergite; traces of this keel visible also on the pygidium. Anterior border beaded, the beads arranged in one row in the middle of the dorsum and in several rows at the sides. The furrow behind the beaded border is sharp. The keels on the under surface of the lateral lobes are reduced to rounded knobs. The marginal bristles (fig. 52) are arranged in one row; they rest on the posterior slope of a strong transverse corrugation. No separate callosities. Peculiar round transparent spots in the zone in front of the bristles. Intersegmental membrane with dense, blunt cones in the median part, the remaining surface densely covered with bristles and numerous pointed hairs. Generally the bristles are scattered; only in this species and *S. subdorsale* are they dense. The pygidium of the ♂ is depressed in the middle; this depression is bounded in front by a rounded protuberance, and passes gradually into the surrounding surface laterally and behind; its width is equal to half the width of the whole pygidium and it is less punctate and pubescent than the remaining surface. The posterior border projects a little in the middle, and bears a narrow protuberance separated from the margin by a furrow. On the under surface are two patches of granules and longitudinal keels, one on each side.

The coxae of the legs declivous on the side, abundantly spined; no lobe or protuberance. Third joint with a serrate edge on the oral

side (fig. 49); last joint with 13 spines below, an unusually large number. Gonopods: the median part of the anterior syncoxites partly visible; the tibia not protruding on the outer side, the process with some little knobs. Tarsus not divided, the stridulating organ well developed; at the tip 2+1 spines; the paired spines rather few (fig. 50). The horns of the posterior syncoxite overlap the bristlelobes; the tibia projects on the outer side. The tibial process with one rigid, blunt tooth (not one or two soft white lobes rising from a round thin-walled opening as in other species). The chitin surrounding the base of this tooth is also thick and rigid. Tarsus without triangular lobe, but with some spines based on low protuberances, and 1-6 little stridulating organs. The pincers as a whole rather clumsy (fig. 48).

Natal.—Port Shepstone (A. 2422), Pinetown (1556), Pietermaritzburg (B. 3410). *Cape Province*.—Coldstream (B. 5300). *Caffraria* (Porat); Port Elizabeth, Knysna, Verulam (Silv.).

107. (20) *Sphaerotherium subdorsale* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 208.

(Pl. II, fig. 53; Pl. III, figs. 54, 55.)

♂, width 8-10.5 mm.

Collum and shield as in *S. dorsale*. Tergites with dense setiferous pits, the hairs along the posterior margin somewhat longer, median keels present. The marginal bristles are arranged in two alternating rows, and do not overlap the margin. No longitudinal callosities at the sides; only near the median line, behind the area of cones, some indistinct, round callosities (fig. 55). Intersegmental membrane densely covered with hairs; in the middle of the dorsum one area of black, thick cones. Anterior border distinctly beaded. Pygidium of ♂ with the posterior border raised in the middle; in front of the margin and separated from it by a furrow is a smooth, shining callosity passing gradually into the sides. The middle of the pygidium is slightly depressed. The whole surface is finely punctate and hairy. The posterior border seen from above is evenly rounded.

No lateral lobe on the coxae. The claw much larger than the upper spine. Third joint with a serrulate edge on the anterior plane, less distinct and shorter than in *S. dorsale*. Second leg of ♀: coxae without protuberance on the outer side; last joint with one spine

above (the only species having this spine), eight spines below. Distal piece of vulva broadly rounded, with a few long hairs. Gonopods: the median suture of the anterior syncoxite visible only in the basal half; tibial process slender; tarsus not divided. The stridulating organ well developed; it has in addition two spines, one simple and one 2-pointed (fig. 53). The horns of the posterior syncoxite overlap the bristle-lobe, their tips not enlarged. The tibia projecting on the outer side. The pincers slender. The tibial process with two broad triangular lobes instead of the finger-shaped lobes. Tarsus without triangular lappet; three pairs of spines based on a low transparent longitudinal ridge; 6-7 knobs visible on the aboral side. The tip of the tarsus not separated off by a suture (fig. 54).

Port Elizabeth (1797), Hogsback (B. 9159), Cape; Transvaal (Silv.).

108. (21) *Sphaerotherium boerium* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 219.
Pretoria (Silv.).

109. (22) *Sphaerotherium apicale* Silv.

1910. Silvestri, Boll. Lab. Zool. Portici, iv, p. 217.
Lourenço Marques (Silv.).

110. (23) *Sphaerotherium eremita* n. sp.

(Pl. III, figs. 56-58.)

Colour chestnut, a small posterior border black. ♀ length 33 mm., width 16 mm.

The head-plate with relatively few setiferous pits in the fore part. Antenna with numerous sense cones. Collum with scattered punctuation. Shield with the brim broad, pubescent, the declivity without keels, the raised surface coarsely punctate; the posterior lobe normal. The tergites densely punctate and hairy; the pits moderately large, the posterior band nearly smooth. No median keel. Marginal bristles (fig. 57) in part reaching beyond the margin; one row of short, black callosities. Anterior border beaded, the beads arranged in two rows, the first weaker and irregular, the second regular and close-set, the beads all very small. The posterior border of the pygidium is weakly raised in the middle. The whole surface densely punctate, especially in the middle. The hairs are minute. Under

surface of the tergites and of the pygidium with narrow, black keels. Coxae (fig. 56) with rounded lobe on the outer side, beset with little spines, the margins hairy, the last joint with six spines, the claw longer than the upper spine. Second leg of ♀: coxae without lobe on the outer side; abundantly pubescent, some spines. Last joint not spined above, four spines below. Distal piece of vulva broadly rounded (fig. 58).

Table Mt., Newlands (7636), Cape.

111. (24) *Sphaerotherium modestum* n. sp.

(Pl. III, figs. 75-77.)

♀: tergites yellowish on the anterior half, olivaceous on the posterior half. Width 14 mm.

Head abundantly and coarsely punctate. Collum with several irregular rows of setiferous pits along the anterior border, some of them scattered. Shield with the brim broad, pubescent, the declivity without keels, the surface with scattered punctuation. Tergites with small but numerous setiferous pits, less numerous on the posterior band. The marginal bristles (fig. 77) arranged in several irregular rows, short, not reaching the margin. The callosities regular. Intersegmental membrane with scattered bristles, small pale cones, and numerous pointed hairs. Anterior margin not beaded. No keels on the under surface of the lateral lobe. Pygidium of ♀ evenly arched, the border neither raised nor thickened, the whole surface with fine but dense setiferous pits. No keel on the under surface laterally. The external lobe of the coxae (fig. 76) large, regular, conical, and pointed, beset with little spines and long hairs, straight and distally directed. Second joint with some spines on the outer side, pubescent, last joint 5-6 spined, the claw long, slender, curved, much larger than the upper spine. Second pair of legs: on the outer side of the coxae one conical protuberance, beset with spines and hairs, and directed obliquely outwards and distally. Last joint not spined above; two spines below. Distal piece of the vulva blunt, conical, sparsely pubescent on the under surface, naked above (fig. 75).

Twenty miles east of Pietersburg, Zoutpansberg Distr. (7488), Transvaal.

112. (25) *Sphaerotherium confiferum* Silv.

1910. Silvestri, Bull. Lab. Zool. Portici, iv, p. 213.

♀, colour dark olive-brown, a large lateral margin of the nuchal

plate and the anterior half of all tergites yellowish-brown. Length 22-32 mm., width 13-16 mm.

Head-plate densely punctured and hairy, the antenna with numerous sensitive cones. The shield densely punctured, a broad zone along the anterior and posterior margins nearly smooth. The brim broad, with dense short hairs above the brim, some fine cross crests in the shining declivity. The posterior lateral lappet broadly rounded, not projecting particularly. Tergites with moderately dense and fine punctures; along the anterior and posterior margins a zone less punctured. No median keel. On the anterior margin a row of very small and indistinct knobs. On the under side of the tergites near the posterior margin a row of very regular, dark-coloured, longitudinal knobs; behind these knobs a row of bristles surpassing the margin; in front of the knobs dispersed bristles. The pygidium regularly vaulted, densely covered with setiferous punctures somewhat coarser than on the tergites. No longitudinal crest on the under side. Coxa of all legs with a long, pointed, conical, oblique lateral process, bearing some conical spines and dispersed hairs; on the terminal margin of the coxa also some conical spines, on the praefemur laterally some conical spines; all joints, especially the praefemur and femur, with dense, long hairs. The tibia not spined above, the tarsus spined $\frac{1}{3-6}$. On the 2nd pair of the ♀ the coxal process is densely hairy and the tarsus spined $\frac{9}{2}$. The operculum of the vulva is slender.

Zandemela (B. 6027), near Limpopo River, Portuguese E. Africa. Lourenço Marques (Silvestri).

113. (26) *Sphaerotherium permodestum* Silv.

1910. Silvestri, Bull. Lab. Zool. Portici, iv, p. 214.
Transvaal.

114. (27) *Sphaerotherium civicum* n. sp.

(Pl. III, figs. 59-63.)

♂: colour dark olive, the posterior border reddish-brown. Length 19.5 mm., width 9 mm.

Head with dense setiferous pits in the fore part and scattered pits behind. Antenna with more than four sense cones. Collum with setiferous pits along the anterior border, the rest nearly smooth. Shield with the brim not broad, sparsely pubescent, no keels on the declivity; the surface with microscopically fine pits; without setiferous pits. The anterior three-quarters of each tergite, excepting

the lateral lobes, provided with dense setiferous pits, the rest nearly smooth. The marginal bristles (fig. 62) arranged in an irregular zone, very short, their tips distant from the margin, bearing short, blunt lateral teeth (fig. 61). In front of the bristles a dark zone without callosities. The cones in the intersegmental membrane are little, rounded, pointed protuberances. Anterior border finely beaded, the beads arranged in some places in more than one row. The whole pygidium with dense and fine setiferous pits; the margin not raised, very slightly thickened. At the sides of the under surface a short, dark-coloured, longitudinal keel. The preceding tergites do not possess a corresponding keel.

External lobe of the coxae (fig. 63) short, rounded, finely pubescent, with short spines. The last joint not swollen below; the number of spines normal. The median suture of the anterior syncoxite partly visible, the telopodite resembling that of *S. dicrothrix*. The horns of the posterior syncoxite (fig. 59) overlap the bristle-lobes more than in *S. dicrothrix*. The tibial process with one finger-shaped lobe. The tarsus divided by a suture, the triangular lappet bearing one black spine; two spines on a little protuberance distal to the lappet (fig. 60).

Burghersdorp (13777), Cape.

115. (28) *Sphaerotherium dicrothrix* n. sp.

(Pl. III, figs. 64-69.)

Colour chestnut. Length 18.5 mm., width 9.5 mm.

Head-plate with coarse setiferous pits, dense in front and scattered behind. More than four sense cones on the antenna. Collum with setiferous pits along the anterior margin. The brim of the shield moderately broad, pubescent, the raised surface not punctate. No keels on the declivity. The anterior half of the tergites, excepting the lateral lobes, with dense setiferous pits; the rest smooth. On the under surface of the lateral lobe one short longitudinal keel. Anterior border not distinctly beaded, the beads being only just discernible in certain lights. The marginal bristles arranged in a single row, some of them overlapping the margin and some forked; mostly two or three simple bristles between two forked ones. This is the only species with forked bristles (fig. 69). In front of the bristles one row of regular short callosities. Pygidium of ♂ and ♀ equally convex, not impressed, the margin not raised, very little thickened. The punctuation of the whole surface dense and very fine. At the sides of the

under surface a little knob corresponding to the keels of the tergites. The granules of the lateral patches connected in the middle.

The external lobe of the coxae (fig. 65) serrate and beset with spines. Second leg of ♀: the lobe of the coxae large, oblique, densely hairy; last joint not spined above; one or two spines below. The claw very long; instead of the basal tooth a little blunt knob. The distal piece of the vulva long and narrow, the tip rounded (fig. 67). The median suture of the anterior syncoxite of the gonopod visible (fig. 64), the tibia protruding on the outer side, the tibial process slender, the tarsus not divided. The stridulating organ well developed. The horns of the posterior syncoxite (fig. 68) extend beyond the bristlelobes a little; they are covered with fine, short, and dense hairs. The pincers are thick and clumsy. The tibia scarcely projecting on the outer surface, sparsely pubescent. The tibial process with one normal and one reduced finger-shaped lobe. The triangular lappet of the tarsus not spined. At the top one mammiform lobe and several spines near it (fig. 66).

Acornhoek (B. 4056), E. Transvaal.

116. (29) *Sphaerotherium solitarium* n. sp.

(Pl. III, figs. 78-80.)

Colour, ♀ dark brown. Width 12 mm.

Head densely punctate in front, sparsely so behind. Antenna with numerous sense cones. Collum with setiferous pits over the whole surface, scattered behind, denser in front. Shield as in *S. civicum* and *dicrothrix*, the brim not broad, pubescent. No keels on the declivity, the raised surface not punctate. The tergites with dense pits, except the nearly smooth posterior band and lateral lobes; anterior border with very fine, somewhat indistinct beads. The marginal bristles (fig. 78) arranged in several irregular rows, short, their tips distant from the margin; simple, not forked, and not laterally toothed. The callosities regular, small, and short. Inter-segmental membrane with pointed cones, scattered hairs, and numerous hair-points. The whole surface of the pygidium with dense and fine setiferous pits. The margin (in ♀) not raised or thickened, no keels on the under surface at the sides (tergites also without such keels).

External lobe of the coxae (fig. 79) slender, pointed, conical, oblique, beset with some long hairs and short spines. Second joint with hairs and some spines. Fifth joint not spined, last joint with six spines below. Second pair of legs: coxae with lateral process directed

transversely, beset with short spines and long hairs; last joint not spined above, two spines below. Distal piece of the vulva irregular, triangular, with rounded angles, sparsely pubescent (fig. 80).

Shiliowane, near Leydsdorp (13512), Transvaal.

117. (30) *Sphaerotherium punctulatum* Brandt.

1841. Brandt, Bull. Ac. St. Petersb. Rec. Mém., p. 179.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 7.

1910. Silvestri, Bull. Lab. Zool. Portici, iv, p. 216.

(Pl. III, figs. 70-74.)

Colour chestnut or olive, the posterior border reddish. Width : ♂ up to 12 mm.; ♀ to 21 mm.

Head-plate with coarse setiferous pits, denser in front. Antenna with numerous sense cones. The setiferous pits on the collum are much finer than on the head; they are denser along the anterior margin. The brim of the shield not broad, pubescent. The declivity not keeled, the raised surface with dense and rather fine punctuation. The setiferous pits of the tergites dense and not coarse in comparison with the size of the animal. They are fewer in the posterior band and very dense and small in the first band covered by the preceding tergite. Anterior border not beaded. Marginal bristles in an irregular zone, short, not reaching the margin. No callosities in front of them (fig. 70). Pygidium with finer and denser setiferous pits than those on the tergites. In the ♂ and ♀ the margin is raised like that of a bell (in the ♂ more than in the ♀) and thickened, the thickening being stronger in the middle and obliquely truncate behind, so that a sharp edge results. Seen from above, the margin is evenly rounded. The ♂ has on each side of the under surface one patch of granules. No keels at the sides.

External lobe of the coxae broad, rounded, directed distally, finely pubescent, not spined (fig. 73). Second leg of ♀: coxae without external lobe, densely pubescent, not spined. The distal piece of the vulva with relatively sharp distal angle, touching the terminal margin of the coxae (fig. 74). Gonopods: tarsus of the first pair 2-jointed (fig. 72). The pincers of the posterior pair short and clumsy. The horns of the syncoxite extend beyond the bristle-lobes. Tibial process with two finger-shaped lobes (not figured or described by Silvestri). Tarsus divided by a suture (fig. 17).

Natal.—Durban (1598, 7610); Umzimkulu (A. 23379). Caffraria, Lower Illovo, Durban (Silv.).

118. (31) *Sphaerotherium giganteum* Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 8.

1910. Silvestri, Bull. Lab. Zool. Portici, iv, p. 212.

(Pl. IV, figs. 81-84.)

Colour chestnut, the posterior border blackish. Width up to 32 mm.

Antenna with numerous sense cones. Head-plate with setiferous pits, dense in front, sparse behind. The pits of the collum small compared with the size of the body. The brim of the shield smaller than in *punctulatum*. No keels in the declivity. The setiferous pits fine and sparse. The tergites densely beset with coarse setiferous pits; but in the anterior and posterior bands of each tergite the pits are scattered. Anterior border not beaded. The marginal bristles (fig. 82) extend beyond the margin a little, their bases alternating. The callosities are well developed and enter posteriorly the zone of bristles. The intersegmental membrane with whole surface between the cones, bristles, and hair-points (fig. 81) finely sculptured. Short, black, longitudinal keels on the under surface and also on the pygidium. The margin of the pygidium is turned up like that of a bell, but less thickened than in *punctulatum* and the thickening is not bevelled off on the under surface and forms no sharp edge. The whole surface with dense, fine setiferous pits. ♂ with one patch of granules on each side of the under surface.

Coxae with a large transverse process on the outer side, the margin of this process sinuate and hairy, and the whole beset with short black spines. Second leg of ♀: coxa with large conical transverse process; last joint not spined above; four spines below. The median suture of the anterior syncoxite of the gonopods distinct. The telopodite abundantly pubescent, the tarsus not divided, bearing besides the stridulating organs two short spines and one black knob at the tip (fig. 84). The horns of the posterior syncoxite do not extend beyond the bristle-lobes, the end not enlarged. The tibia projects on the outer side. Tibial process with only one finger-shaped lobe. The edge turned to the tarsus beset with little knobs. Tarsus not divided, bearing one broad triangular lobe with several spines, or a little protuberance with three spines and a row of stridulating organs (fig. 83).

Natal.—Umzimkulu (23379), Riet Vlei (7750), Durban (B. 2272), Pietermaritzburg (33409). *Transvaal*.—Barberton (7484), Shiliowane,

near Leydsdorp (13513). *Cape Province*.—Kandoda (B. 2274), Port St. Johns (23369). *Mozambique*, ♂ (1653). *Caffraria* (Silv.).

Species incertae sedis.

Sphaerotherium grossum Koch.

1863. Koch, Die Myriop., i, p. 5, pl. ii, fig. 6.
Cape of Good Hope.

Sphaerotherium lichtensteinii Brandt.

1833. Brandt, Bull. Soc. Nat. Moscou, vi, p. 199.
1863. Koch, Die Myriop., i, pl. xiv, fig. 29.
South Africa.

Sphaerotherium microstictum Brandt.

1841. Brandt, Bull. Ac. St. Petersb. Rec. Mém., p. 178.
Cape.

Sphaerotherium monticola Poc.

1895. Pocock, Ann. Mag. Nat. Hist., (6), xvi, p. 410.
Table Mountain.

Sphaerotherium nigrum Butl.

1872. Butler, Ann. Mag. Nat. Hist., (4), x, p. 359, pl. xviii, fig. 11.
South Africa.

Sphaerotherium obtusum Koch.

1863. Koch, Die Myriop., i, p. 5, pl. ii, fig. 5.
1886. Bourne, J. Linn. Soc., xix, p. 161.
Port Natal.

Sphaerotherium pubescens Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 7.
Caffraria.

Sphaerotherium punctatum Brandt.

1833. Brandt, Bull. Soc. Nat. Moscou, vi, p. 199.
1863. Koch, Die Myriop., i, p. 43, pl. xix, fig. 37.
South Africa.

Sphaerotherium rugulosum Brandt.

1871. Brandt, Bull. Ac. St. Petersb. Rec. Mém., p. 179.
Cape.

Gen. OLIGASPIS.

Oligaspis puncticeps Wood.

1865. Wood, Proc. Ac. Nat. Sci. Philadelphia, p. 173.

1869. Wood, Trans. Amer. Philos. Soc., xiii, pl. ii, fig. 17.

Port Natal.

“Corporis segmenta 9. Antennae brevissimae, quinque articulae. Oculi aggregati.” A mysterious animal!

Gen. KYLINDOTHERIUM nov.

The telopods combine the characteristics of *Sphaerotherium* and *Globotharium*. The first joint of the telopodite of the anterior telopods wants the crests, as in *Sphaerotherium*. The second joint of the posterior telopods wants the strong keels and is smooth laterally, as in *Globotharium*. No conical spines or teeth on the under side of the pygidium.

The vulva as in *Sphaerotherium*: the operculum is not bilobed, but narrowed and rounded distally.

In all remaining characteristics like *Sphaerotherium*.

119. *Kylindotherium leve* n. sp.

(Pl. XXVI, figs. 560-563.)

Colour black, when in alcohol partially chestnut, especially the pygidium. ♂ width 10 mm.

The head-plate with dispersed rough punctures, bearing minute hairs. Antennae with four sensitive cones. The collum smooth, along the anterior margin a row of pits. The nuchal plate and the tergites shining and smooth and not hairy; the microscopical pores visible only with a strong lens. On the anterior margin of the tergites a regular row of little beads and before this row some irregularly arranged beads. The knobs on the under side of the tergites near the posterior margin are somewhat irregular, bright brown or black; the bristles behind the knobs are short, the point distant from the margin; they are arranged in one or two irregular rows. On the under side laterally a black longitudinal keel; the pygidium has a low boss on the corresponding place. The crest of the nuchal plate broad, pubescent, posteriorly broadly rounded. In the shining declivity some fine crests. The posterior half of the pygidium with

some fine setiferous punctures and with a very shallow cross impression. The posterior border regularly vaulted. The whole under side is densely hairy; the areas of pointed cones present in the ♂ of *Sphaerotherium* are wanting, in correspondence with the absence of the grooves on the second joint of the posterior gonopods. The coxa of the first leg with a short, blunt, lateral process; the tarsus spined $\frac{9}{5}$. The coxa of the second leg of the ♀ has no lateral lobe; the tarsus spined $\frac{9}{5}$. The operculum (fig. 562) is rounded, not sinuate. The coxa of the legs in the middle of the body with a lateral, hairy lobe beset with numerous little conical spines; the tarsus spined $\frac{1}{4-6}$. The tibia not spined above (fig. 563).

Telopods, anterior pair (fig. 560): in the syncoxite we see the traces of the median suture. The first joint of the telopodite wants the crests present in *Globotharium*. The second joint with a slender digitiform process. The presence of rasp-knobs could not be made out in the single specimen. The syncoxite of the posterior telopods (fig. 561) resembling the syncoxite of *Sphaerotherium*; the processes finely and shortly pubescent. The telopodite differs from that of *Sphaerotherium* in the weaker development of the stridulating organ. The second joint is laterally smooth, and wants the strong crests or keels of *Sphaerotherium*. The process of the second joint has a 2-lobed lappet near the base. The third joint bears a white triangular lobe and distally a low boss with a little point, a row of furrowed rasp-buttons, and fine protuberances.

Witte River (5335), Wellington, Cape.

2. Division **Proterandria** Verh.

- 1887. *Helminthomorpha* Pocock, Ann. Mag. Nat. Hist., (5), xx, p. 294.
- 1894. *Helminthomorpha* Pocock, Max Weber's Reise, p. 333.
- 1896. *Helminthomorpha* Silvestri, I Diplopodi, p. 31.
- 1898. *Helminthomorpha* Attems, Syst. d. Polydesm., i, p. 7.
- 1900. *Proterandria* Verhoeff, Beitr. z. K. Pal. Myr. X. Zool. Jahrb., xiii, p. 53.
- 1910. *Proterandria* Verhoeff, Nova Acta, xcii, p. 210.
- 1910. *Proterandria* Verhoeff, Diplop. Deutschl., p. 21.
- 1913. *Proterandria* Verhoeff, Zool. Anz., xliii, p. 49.
- 1914. *Helminthomorpha* Attems, Indo-Austral. Myr., p. 52.
- 1926. *Proterandria* Attems, Kükenthal's Handb. d. Zool., iv, p. 126.

Seventh somite with at least one pair of gonopods, often two pairs; sometimes the second pair of the sixth and the first pair of the eighth segment are modified. No telopods at the posterior end of the body. The sternites of the abdomen not divided. The tracheae rise in great numbers from cribriform perforated areas of the tracheal trunks, and are not branched. The external tooth-piece of the mandible is free, not coalesced with the middle piece. The step of the epipharynx is attached to the lower lamella of the labrum. The genital glands open on the coxae of the second pair of legs or behind these.

1. Superorder EUGNATHA Att.

1898. Attems, Syst. d. Polydesm., i, p. 227.

1914. Attems, Indo-Austral. Myr., p. 152.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 128.

First pair of appendages of the seventh somite modified into gonopods; often the second pair of this somite and the adjacent pairs of the sixth and eighth segments are also modified. Gnathochilarium with three pairs of palpal lobes. Cheeks (pleurites of the head) large, well developed. Pars lamelligera of the mandible strongly developed.

Verhoeff considers the *Colobognatha* as the fourth order of his *Proterandria*, all the orders being related in the same degree. Consequently he does not divide the *Proterandria* into two groups as I do. I believe that the difference with respect to the gonopods between the two groups, *Colobognatha* and *Eugnatha*, is so great that they must be considered as two branches descending from common ancestors, one of these two branches, the *Eugnatha*, dividing again into three subdivisions. This view, which is typified by the group *Eugnatha*, is my own.

Synopsis of the Orders of Eugnatha.

- 1a. Two or three pairs of spinning glands opening by 1-3 pairs of spinning styles on the anal segment *Nematophora* Verh.*
- 1b. No spinning glands or spinning styles 2.
- 2a. Gnathochilarium without praebasilare. Only the first pair of appendages of the seventh somite modified into gonopods, the gonopods inserted in a circular opening closed all round. Second pair of legs of seventh somite normal. The sternites do not participate in the formation of the inserted cylinders. 19-22, generally 20 segments *Polydesmoidea*.

* This order is not represented in South Africa.

- 2b. Praebasilare present. Both pairs of appendages of the seventh somite modified into gonopods, or the second pair sometimes wanting; never a normal pair of legs. The ventral ends of the seventh tergite are free or coalescent behind the opening for the gonopods. This opening is never closed in front. The gonopods are sunk into a membranous pouch. The sternites participate in the formation of the inserted cylinders. More than 40 segments *Juliformia*.

Order POLYDESMOIDEA.

1847. *Polydesmidae* C. Koch, Syst. Myr., p. 52.
 1884. *Polydesmidae* Latzel, Myr. Oest. Ung. Mon., ii, p. 124.
 1887. *Polydesmoidea* Pocock, Ann. Mag. Nat. Hist., (5), xx, p. 294.
 1893. *Polydesmoidea* Bollmann, Bull. U.S. N. Mus., No. 46, p. 155.
 1895. Suborder *Polydesmoidea* Cook, Ann. N.Y. Ac. Sci., ix, p. 4.
 1896. Suborder *Polydesmoidea* Silvestri, I Diplopodi, p. 68.
 1898. Suborder *Polydesmoidea* Attems, Syst. d. Polydesm., i, p. 227.
 1903. Order *Merocheta* Silvestri, Diplop. Anat., p. 23.*
 1909. Group *Polydesmoidea* Pocock, Biol. Centr. Amer., p. 109.
 1910. Superfam. *Polydesmoidea* Verhoeff, Nova Acta, xcii, p. 210.
 1914. Order *Polydesmoidea* Attems, Indo-Austral. Myr., p. 152.
 1915. Suborder *Polydesmoidea* Brölemann, Essai Polyd. Ann. Soc. Ent. Fr., lxxxiv, p. 523.
 1926. Order *Polydesmoidea* Attems, Kükenthal's Handb. d. Zool., iv, p. 129.

In 1898 I published the first systematic revision of the whole group, which had remained untouched for a long time. Since then our knowledge has much increased and our views of the principles of classification have changed, and in the end nobody was less satisfied with the "System der Polydesmiden" than the author himself. The first system was based too much upon the characters taken from the external features of the body. In 1914 I published a new system completely different from the first, based principally upon the sexual characters, and this system I still use.

In 1915, a year after my paper, Brölemann published his "Essai sur les Polydesmiens," which agrees in many points with my system. The principles adopted are the same and many groups are identical with mine. In the details there are certainly many differences, but

* The *Merocheta* of Cook comprise the *Polydesmoidea*, *Lysiopetaloidea*, and *Chordeumoidea*.

I cannot enter into these here, the groups in question having no connection with the South African fauna.

Brölemann, in his paper, does not go deeply into the classification which he sets up and does not give diagnoses or synopses, and we therefore do not know how he defines the groups and why he places the genera in a given family. It seems that Brölemann did not know in 1915 my paper of 1914. Perhaps this was a consequence of the War. As far as I know he has not attempted during the last twelve years to set out the synonymy between his paper and mine.

No spinning glands. Gnathochilarium without praebasilare. The promentum is never separate. The somites are cylinders closed ventrally and each inserted into the foregoing somite ("Einschub-cylinder," Verhoeff). The anterior sternite does not participate in the formation of this cylinder. The abdominal sternites are completely coalesced with the tergites. The tracheal trunks are branched; most of the tracheae rise from the basal half, some also from the inner ends. Pores generally present, but never on all the abdominal segments; they are wanting on the sixth and generally also on the eighth, eleventh, and fourteenth segments; rarely wanting altogether. No coxal pouches. The cheeks consist of 7-8 parts, 4-5 belonging to the anterior, 3 to the posterior cephalic pleurite. The mandibular plate (Reibepatte) without file, but with ridges and saw. Median area of the epipharynx without longitudinal thickening and without teeth and warts. Hypopharynx with special compression knobs. Collum without condyle. The vasa deferentia open on the coxae of the second pair of legs. The first pair of appendages of the seventh somite transformed into gonopods, the second pair of this somite with normal legs. Number of segments 19, 20, 21, or 22. The number constant in each species. Sometimes the males have one segment less than the females.

The South African families may be distinguished by the following key:—

Key to the Families of Polydesmoidea.

- 1a. The coxae of the gonopods connected by broad, medially coalescent processes; the median part raised, keel-shaped
(Suborder *Polydesmoidea*) Fam. *Vanhoeffeniidae* Att.
- 1b. The coxae of the gonopods free or more or less connected, but not by broad, medially keel-like, raised processes . . . (Suborder *Strongylosomidea*) 2.
- 2a. Certain joints of the anterior (or more) legs with spherical bristles

Sphaerotrachopidae Att.

- 2b. None of the legs with spherical bristles 3.
 3a. Femur of the gonopod ovate, well defined from the tibia, hairy; the tibia hairless. The keels of the second segment generally (in all South African genera) lying below the level of the following keels

Strongylosomidae Att.

- 3b. Femur and tibia of the gonopod completely fused without any trace of a demarcation; the hairs extending to the slender tibial part. Keels of the second segment on the same level with the following keels

Gomphodesmidae Cook.

Fam. STRONGYLOSOMIDAE Att.

1914. Attems, Indo-Austral. Myr., p. 184.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 140.

Coxae of the gonopods relatively long and slender. Femur short, ovoid, wholly hairy, well defined, and separated from the tibia. Tibia generally with a long, slender, flagelliform process with the seminal duct; the tarsus broad, lamelliform, forming a sheath for the tibial process; or the tibial process strong and free; in rare cases the whole telopodite is simplified to the form of a simple sickle (*e.g.* gen. *Gonodrepanum*).

Nineteen or twenty segments. The keels are very variously developed; if present they are thickened laterally; sometimes they are represented only by a fine edge, sometimes they are completely wanting. Generally the keels of the second segment lie more ventrally than the collum and the keels of the third segment. Pores generally present on segments 5, 7, 9, 10, 12, 13, 15-18, or 19. In *Xanthodesmus* they are wanting on the fifth segment. Caudal process generally conical, rarely broader, hollowed out on the ventral side. Sternite five often, sternite six sometimes, with one or two processes. The legs of the ♂ often with peculiarities (knobs, etc.), but never with spherical bristles. Size small or medium.

Distribution.—All regions except the Nearctic; especially the Indo-Australian Region.

In the above-cited paper (1926) I gave a key to all the numerous genera. In South Africa only three genera occur: two already known, *Phaeodesmus* and *Orthomorpha*; and one new genus, *Podochresimus*, nearly allied to *Phaeodesmus*. *Orthomorpha* is represented by *O. gracilis*, imported into many European hot-houses and probably also imported into South Africa from India or South America. Thus all the South African Strongylosomidae spread by natural means are derived from *Phaeodesmus*-like forms.

Vaulogerodesmus Bröl. = *Nedyopus* Att.
Tricladosoma Bröl. = *Akamptogonus* Att.
Helicorhabdosoma Bröl. = Subgen. *Helicorthomorpha* Att.
Stosatea Bröl. = *Entothalassinum* Att.

Key to the South African Genera of Strongylosomidae.

- | | |
|--|----------------------------------|
| 1a. Tarsus of gonopods bent on the base of the gonopod | 2. |
| 2a. Femur of certain anterior pairs of legs of ♂ with ventral digitiform process | <i>Phaeodesmus</i> Cook. |
| 2b. Femur of male legs without digitiform process | <i>Habrodesmus</i> Cook. |
| 1b. Tarsus of gonopods straight, directed distally | 3. |
| 3a. On the tip of the gonopodial tibia a lateral branch | <i>Podochresimus</i> nov. gen. |
| 3b. On the tip of the gonopodial tibia no lateral branch | <i>Orthomorpha</i> sens. strict. |

Twenty segments. Pores on segments 5, 7, 9, 10, 12, 13, 15-19. Gonopods: tibia short and very broad, with two pointed lateral branches on the inner surface and on the lateral margin. Tibial process long, slender, arcuate, and enclosed by the half-canal formed by the tarsus. Tarsus large, bi- or tri-ramous; one branch is the sheath for the tibial process, the remaining two branches are broad, rounded plates. Second segment with small oblique ridges, situated deeper ventrally than the sides of the collum; the segments following without keels or longitudinal furrows. Metasomites with shallow transverse furrow; the segments constricted at the suture, the suture smooth. Surface of dorsum smooth. Sternite five with one bristled process between the legs of the anterior pair; the remaining sternites without processes, spines, or cones. The tail conical, pointed; anal scale arcuate with two long bristles; anal valves with small border and two long bristles. On the ventral side of the third joint of the legs of the ♂, beginning from the second pair, one bristled or naked knob; the last joint and sometimes also the penultimate joint with a dense brush on the ventral side. The females of the species so far known are very similar and cannot be distinguished with certainty.

Key to the Species of *Podochresimus*.

- 1a. Pleural crests of the anterior segments unusually large, of the same size as the lateral keels. Gonopodial tarsus biramous . . . *alatus* n. sp.
- 1b. The pleural crests are fine edges. Gonopodial tarsus triramous . . . 2.
- 2a. The sheath-branch of the gonopodial tarsus bilobed; one lobe with numerous spinules *aculeatus* n. sp.
- 2b. The sheath-branch without the above-mentioned peculiarities. . . . 2.
- 3a. The process of the fifth sternite conical and pointed. The sheath-branch of the gonopodial tarsus with one large lateral spine; the remaining two branches of the tarsus are rounded plates directed towards the base. The distal tooth of the gonopodial tibia is somewhat far from the margin and slender from the base. The coxal process of the second leg conical and reaching beyond the terminal margin of the coxae *republicanus* n. sp.
- 3b. Process of the fifth sternite truncate and not narrowed distally. The sheath-branch of the gonopodial tarsus without lateral spine; the second branch is a stalked plate directed distally. Coxal process of the second leg low, broadly rounded, not reaching beyond the coxae *fonticinus* n. sp.

120. *Podochresimus alatus* n. sp.

(Pl. XXI, figs. 513, 514; Pl. XXII, fig. 515.)

Colour light chestnut, sternite and legs yellowish-brown, antennae darker, brightly ringed at the articulations. Width 2·3 mm.

Surface of the metasomites smooth, the cross furrow scarcely visible; the transverse suture smooth. The posterior corner of the lateral keels toothed, beginning from the second segment and surpassing the posterior border of the metasomites. The tooth is blunt on the anterior segments and becomes sharper on the posterior segments. Seen from above the keels are narrow crests. Between the anterior legs of the fifth segment a large lamelliform process, rounded, distally somewhat enlarged, and the distal border slightly sinuate (fig. 515). The anterior side beset with minute hairs. The posterior sternites without processes. The pleural crests of the anterior segments are unusually large, wing-like (hence the name), of the same size as the lateral keels. On the segments after the copulatory segments they are much weaker and they are visible to the fifteenth segment. The third joint of the 3rd-5th pairs of legs with a blunt, oblique pin, which is not beset with hairs (the 6th and 7th pairs of legs without these pins) (fig. 514). The joints, beginning from the praefemur, of the 3rd-7th pairs with low, rounded bosses below. The tarsus of the 1st-7th pairs with a dense brush of hairs; a little tuft of such hairs on the distal end of the tibia. The legs are long, thickened to the femur in the ♂. Gonopods (fig. 513): the femur well separated from the tibia. On the tibia, before the

base of the tibial process, a long, pointed, inwardly directed lappet and a second rounded little lappet. Tibial process long and slender. Tarsus divided into two branches. One branch conical and directed to the base; the second branch is the sheath for the tibial process; its tip is cleft.

Nyaka, Inhambane (5986), Portuguese E. Africa.

121. *Podochresimus aculeatus* n. sp.

(Pl. IV, figs. 90-93.)

Colour nearly black. Width 1.8 mm. The segments are constricted by the smooth suture. No keels. The surface seems to be smooth; but the animals are so badly preserved that I cannot say this for certain. Transverse furrow of the metasomites weak. Sternite five with one bristled, low, conical process between the legs of the anterior pair. Sixth and following sternites without process; sternites with transverse impression and long bristles. First pair of legs of ♂ without peculiar processes. Pairs three, four, and five with one densely pubescent knob on the third joint (fig. 93). The tactile bristles of the first and second joints very long, the ventral side of the fifth and sixth joints with dense brushes; only the last joint before the terminal claw is not bristly. The legs behind the gonopods have no knob on the third joint, and the fifth joint has a short brush only at the tip of the ventral side. The last joint has the same brush as on the anterior legs. Gonopods (fig. 91): coxa without peculiarities; tibia oval, densely covered with long hairs, well defined. Tibia narrow at the base, then enlarged; bearing two teeth, one on the margin and one on the inner surface. Tibial process long, whip-like; its thin and pointed end is protected by the sheath-branch (fig. 92) of the tarsus. The second branch is bilobed, one lobe distally enlarged and truncate, the second beset with numerous little spines, cones, and hairs.

Clanwilliam Div. (7569), Cape.

122. *Podochresimus republicanus* n. sp.

(Pl. IV, figs. 85-89.)

Colour chestnut; the posterior half of the dorsum of each metasomite, the ventral side and the legs yellowish. ♂ length 18 mm., width 2 mm.

Clypeus pubescent, vertex hairless. Surface of trunk smooth, hairless, and shining. Second segment with fine oblique ridges, ending anteriorly below the sides of the collum. The following segments without keels (fig. 85); the sides slightly swollen, this swelling passing gradually into the surrounding surface. The segments are distinctly constricted by the suture, the suture smooth. The tail thick and short, conical, straight, with long, scattered hairs; anal scale arcuate and pointed, with two long bristles; anal valves with high but narrow borders. Sternites pubescent, with transverse impression; the fifth sternite with one conical and long-bristled process. The remaining sternites without processes. The legs of the ♂ relatively slender and weakly pubescent, except the tarsus and first leg. Coxal process of the second leg (fig. 89) short, rising from the terminal margin of the coxae and therefore extending beyond them. Third joint of legs 2-7, and of some legs behind the gonopods, with a prominence on the ventral side, bearing a little pencil of dense, long bristles (fig. 88). The size of this prominence increases gradually from the second to the seventh pair of legs. Ventral side of the last joint of nearly all legs with a brush of long dense bristles, the brush half as long as the joint. In the ♀ the brush is wanting.

The gonopodial opening is a regular transverse oval, the posterior margin not visibly raised, the whole margin smooth (not notched). Gonopods (fig. 86): coxae and femur like those of the allied species; the shape of the suddenly enlarged tibia is also the same. The two lateral teeth of the tibia with their bases form almost a semicircle; the distal tooth is somewhat removed from the margin on to the inner surface; both are slender, curved, and pointed. The tibial process is biramous, one very slender arm bearing the seminal duct, the second arm wider and embracing the first; both are clasped by the sheath-branch of the tarsus. The sheath-branch has one straight, pointed lateral tooth (wanting in the allied species); soft lamellae form the sheath for the tibial process (fig. 87). Spinules and hairs as in *P. aculeatus* are wanting. The second and third lamellae of the tarsus are broad, rounded, and curved basally.

Cape Province.—Houw Hoek, Caledon (7336, 7621), Hout Bay (7742), Table Mt., Kirstenbosch (7635), Wynberg, Cape Peninsula (1526), Kogman's Kloof, near Ashton (1681), Devil's Peak (7370), N.W. part of Cape Province (7587), Camps Bay, Cape Peninsula (B. 999).

123. *Podochresimus fonticinus* n. sp.

(Pl. IV, figs. 94-98.)

The animals were dried and details were not all visible with full accuracy. Colour now uniform earth-brown. Width 2.4 mm.

Second segment with oblique fine ridges. The following segments without keels. The segments distinctly constricted by the smooth suture. The transverse furrow of the metasomites weak. Surface of the trunk smooth, hairless, shining. A fine pleural edge present up to the fifth segment. Anal segment as in *P. republicanus*. In general no differences between these species excepting the secondary sexual characters.

Sternite five with one uniformly broad, weakly pubescent, lamelli-form process between the legs of the anterior pair (fig. 96). The remaining sternites without processes. The anterior legs of the ♂ noticeably thicker than in *P. republicanus*. The inner end of the coxa of the second leg is inflated and a little prominent, without forming a distinctly separate process (fig. 97). The bristly prominence on the ventral side of the third joint weak on the second to the fifth pair (fig. 98), large on the sixth and seventh pairs. The brush covers nearly the whole under surface of the last joint and the greater part of the fifth joint. Gonopods (fig. 95): coxa and femur as in allied species. Tibia becoming suddenly enlarged, bearing two teeth, one proximal on the inner surface, one distal on the margin, the latter pointed. The tibial process is not biramous but simple, the tarsus is trilobed. The sheath-branch (*a*) has no lateral teeth and no spinules and hairs. The second branch (*b*) is a stalked rounded plate, the third branch a curved rounded lamella (*c*) (fig. 94).

Stellenbosch (14644), Tulbagh (13504), Cape.

Gen. HABRODESMUS Ck.

124. *Habrodesmus rhodesianus* n. sp.

(Pl. IV, figs. 99-101; Pl. V, fig. 107.)

Colour light chestnut; the posterior half of each metasomite, the keels, the tail, and the legs yellow. (As the specimens have been lying for a long time in alcohol, the original colour was perhaps different.) Width 1.8 mm.

Clypeus pubescent; antennae long and slender. Vertex furrow sharp. Sides of collum rounded, a little raised. Dorsum strongly

arched, the keels well developed, with a tooth-like posterior end reaching beyond the posterior margin from the second segment onwards. The keel is sharply defined dorsally; the pore opens in a flattened boss below the lateral edge. The dorsal margin of the metasomite with one or two little teeth near the lateral keel. Metasomites smooth, hairless, the transverse furrow distinct. The pleural edge present up to the seventeenth segment. Tail cylindrical, straight. Sternites broad, with shallow transverse furrow and long, scattered hairs. Sternite five with one large rounded pubescent lamella slightly notched in the middle (fig. 107). Sternite six without process. Sternites behind the gonopods with four hairy protuberances, the two anterior protuberances of each shorter than the posterior ones. Coxae and praefemur with one very long ventral bristle. Third joint of first leg in the ♂ without process. All legs without spines. Nearly the whole of the sixth and the distal half of the fifth joint of legs 1-7 with a dense brush; all the rest of the joints with scattered hairs. The hairs on the dorsal surface of the praefemur and femur are shorter and hooked. Gonopods (figs. 99-101): coxae and femur without peculiarities; the femur well defined and strongly bristled. Tibia short and broad. On the inner side in the middle one short, irregularly curved little hook (*h*); near the insertion of the tarsus one broad lamella (*p*), and on the opposite side one little process directed laterally (*f*). The tarsus is flattened down basally, and embraces with its lamellae the tibial process, which is long, thin, and whip-like. The tip of the tarsus is divided into several soft, partly fringed, small lobes. Their shape is difficult to describe, but is represented in the drawings (figs. 100, 101).

Salisbury (B. 3354), Rhodesia.

Gen. PHAEODESMUS Cook.

1898. Cook, *African Strongyl.*, Proc. U.S. N. Mus., xx, pp. 696, 706.

1914. Attems, *Indo-Austral. Myr.*, p. 215.

Gonopods: tibia short and broad, with one or two lateral branches proximal to the tibial process. Tibial process thin, filiform, more or less embraced by the tarsus. Tarsus well defined, large, forming a hollow leaf. Twenty segments. Keels well developed, tooth-like or rounded posteriorly. Metasomites smooth, with transverse furrow. Suture smooth or beaded. Pores on segments 5, 7, 9, 10, 12, 13, 15-19. Sternites behind the gonopods with two or four cones or spines. Sternite five with one or two processes between the legs of

the anterior pair. Tail conical. The fifth and sixth joints of the legs of the ♂ with or without a brush of bristles.

Distribution.—West, East, and South Africa.

Key to the Species of Phaeodesmus.

- 1a. On the tip of the tibia no lateral branch. 3rd–6th pairs of legs with digitiform process *niger* n. sp.
- 1b. On the tip of the tibia one lateral branch. 3rd and 4th or 5th and 6th pairs of legs with digitiform process 2.
- 2a. 3rd and 4th pairs of legs with digitiform process. Sternite 5 with one lamella. Colour of body chocolate-brown *longipes* (Att.).
- 2b. 5th and 6th pairs of legs with digitiform process. Sternite 5 with two conical processes. Body blackish *aloyssi sabaudiae* Silv.

125. *Phaeodesmus niger* n. sp.

(Pl. XXI, figs. 503–506 ; Pl. XXVI, fig. 567.)

Colour nearly black. Width 2 mm.

The lateral keels are inflated, dorsally sharply defined (fig. 503). Seen from the side they are triangular, the posterior blunt tooth only slightly surpassing the posterior margin of the metasomite. The pore is directed outwards, lying in the middle of the keel. The keel of the second segment is situated more ventrally than the following ones. The segments are constricted at the transverse suture ; the latter finely beaded. A distinct transverse furrow present up to the eighteenth segment. The surface of the metasomite very finely wrinkled. Near the posterior dorsal margin some low granules. The pleural keels are well developed in the anterior half of the body. The sternite of the fifth segment has a bilobed process between the coxae of the anterior pair (fig. 505). The sternite of the sixth segment without prominence. The posterior sternites hairy.

The femur of the 3rd–6th pairs of legs (fig. 567) with a ventral digitiform process. The tarsus of the legs before the copulatory segment with a dense brush of bristles. On the top of the tibia a little pencil of similar bristles. The opening for the gonopods is constricted in the middle (fig. 506). Gonopods (fig. 504) : the tibia is largest in the middle, the tibial process (*Tf*) is slender and pointed, sheathed by the tarsus (*Ta*). The tarsus is relatively narrow, folded back along the tibia ; near the base a strong lateral tooth.

S.W. Africa.—Namutoni (B. 5939), Sandup (5972), Otjimbumbe, Kunene River (5942).

- 2a. Pores on segments 5, 7, 9-19; femora of the gonopods coalescent
Pleonaraius Att.
- 2b. Pores on segments 5, 7, 9, 10, 12-19; keels very large and broad. General appearance that of a *Cryptodesmus* *Platytrarus* nov. gen.
- 2c. Pores present on segments 5, 7, 9, 10, 12, 13, 15-19 3.
- 3a. Legs of ♂ without cones or spheres *Harpethrix* nov. gen.
- 3b. Legs of ♂ with cones or spheres 4.
- 4a. The surface, including the anal valves, densely granular. Keels very broad. The lateral margin thin, without marginal thickening *Microporus* Att.
- 4b. Dorsum smooth, sometimes with transverse rows of large tubercles, never granular 5.
- 5a. Telopodites of the gonopods not coalescent 6.
- 6a. The praefemur and the following joints of the anterior legs with spheres
Gnomeskelus nov. gen.
- 6b. Praefemur always, femur and tibia generally without spheres or sphere-like bristles, with short, curved, strong bristles or with long soft hairs . 7.
- 7a. Praefemur and femur with a few long thin hairs; femur, tibia, and tarsus with spheres *Anaulacodesmus* Att.
- 7b. Praefemur and femur with short, strong, sickle-like bristles. Tibia with sickle-like bristles or spheres. Tarsus with spheres or sphere-like bristles . 8.
- 8a. Metasomites without distinct lateral keels, at most with roundly inflated ones (South America) 9.
- 9a. Metasomites with three rows of flat protuberances. Sternite 5 without process *Myrmekia* Att.
- 9b. Metasomites without dorsal protuberances. Sternite 5 with two hairy processes *Semnosoma* Silv.
- 8b. Metasomites with distinct keels toothed posteriorly (South Africa)
Philocaffrus nov. gen.
- 5b. The telopodites of the gonopods partly coalescent 10.
- 10a. On the aboral side of the gonopodial femora a transverse crest bounding a groove. Dorsum of metasomites smooth. (Chile.) . *Chiliosoma* Bröl.
- 10b. No crest on the aboral side of the gonopodial femora. Dorsum of metasomites with three rows of bristle-bearing tubercles. (South Africa.)
Gonokollesis nov. gen.
- 11a. (2) Pores present on segments 5, 7-18. (Dorsum with rows of tubercles and bristles.) *Sphaerotrichopus* Att.
- 11b. Pores present on segments 5, 7, 9, 10, 12, 13, 15-18 12.
- 12a. Tibia with strong styles. (Keels distinct. Dorsum without tubercles or bristles.) *Icosidesmus* Carl.
- 12b. Tibia without groups of styles 13.
- 13a. Body nearly cylindrical, without distinct keels, dorsum smooth
Oligodesmus Att.
- 13b. Keels well developed, the lateral margin dentate. Dorsum of metasomites with rows of bristle-bearing tubercles *Scytonotus* Koch.

Gen. PLATYTARRUS nov.

Twenty segments. Pores present on segments 5, 7, 9, 10, 12, 13, 15-19; laterally situated. General appearance that of a *Cryptodesmus*. Collum much larger than the head, but not covering it.

Antennae slightly or not at all incrassate at the tip. Keels of the metasomites very broad and flattened; dorsum with transverse rows of low protuberances. Posterior border of the metasomite beset with small, generally forked, pointed hairs. Tail conical. Praefemur, femur, and tibia of the anterior legs of the ♂ with short, sickle-shaped bristles. Tarsus (both joints) with spherical bristles. Coxae of the gonopods coalescent, the suture persisting. The bases of the telopodites contiguous. At the middle of their inner margins the two telopodites are coalescent. The parts of the telopodite not marked by sutures.

127. *Platytarrus cryptodesmoides* n. sp.

(Pl. IV, fig. 102; Pl. V, figs. 103–106.)

Colour reddish-brown. Width: prosomite 1.8 mm., metasomite 3.5 mm.

Clypeus with scattered hairs. Collum very broad, nearly as broad as the second segment; much broader than the head, but not concealing it. The keels (fig. 106) are very broad and inserted high up; the dorsum is therefore more or less flat; the anterior angle rounded, the lateral margin weakly convex with three (on the poreless) or four (on the pore-bearing segments) weak notches, bearing little hairs. The posterior angle is acute and tooth-like only on the last segment. The dorsal surface of the keels is polygonally reticulate. On the dorsum between the keels one transverse furrow, the space in front of this furrow nearly smooth; behind the furrow two rows of flat protuberances or areas; the longitudinal furrows between the posterior areas begin in notches in the posterior margin; on the sixth segment there are 13, on the posterior segments 21 notches; in the middle of the arcuate margin between two notches a little hair. The pores open laterally on the narrow border, scarcely swollen in the neighbourhood of the pore. The fringed posterior border of the metasomites broad; the fringes coalescent for the greater part of their length, the free points of the fringes generally forked, rarely simple, or 3-pointed (fig. 102). The fringed border is not the immediate prolongation of the posterior margin of the metasomite, but of a duplication of it under the margin. Sternites much broader than long, with a transverse impression, two rows of soft hairs, without processes. Anal segment: tail conical, scale triangular, the angle rounded, with two bristles.

The praefemur and femur of the legs in the ♂ are much incrassate; the base of the femur stalk-like and narrowed; the upper side of the

praefemur prominent and rounded. Coxa and praefemur with one long bristle. Praefemur, femur, and tibia with short, arcuate bristles. The tarsus with spherical bristles; the second joint of the tarsus with numerous, the other joints with scattered, bristles. The gonopodial opening oval, only little broader than long; the sides of the surrounding parts are raised; the band in front of the opening is broad, the one below narrow. Gonopods (figs. 103-105): the basal parts with the coxal horn are mutilated through dissection, and I cannot give a precise description. The coxae are fused, the suture persisting. The base of the telopodite is but little swollen; the femora are contiguous; the telopodite is a little narrowed, then enlarged, and the two telopodites coalescent. The tip is divided into several branches; on the oral side one arm (*a*) standing directly out and beset with blunt lateral spines; two terminal lamellae, one of them (*b*) bearing the seminal duct (the first branch and this latter are probably parts of the tibia); the second terminal lamella (*c*) is dentate. On the aboral side two strong spines.

Krom Spruit, Herschel (B. 2226), Cape.

Gen. GONOKOLLESIS nov.

Twenty segments. Pores present on segments 5, 7, 9, 10, 12, 13, 15-19. General appearance that of a small *Haplosoma*, without distinct keels. Somites constricted at the suture. Sternites five and six without process. Tail conical, pointed, weakly curved downwards. Praefemur, femur, and postfemur of the first to eighth pairs of legs with numerous curved bristles on the under surface; tibia and tarsus with numerous spheres, intermixed with hairs. Gonopods with the coxae coalescent; they are not appreciably produced laterally at the extremity. The telopodites are coalescent along more than half of their inner margins. No boundaries of joints visible. The extremity has many rami; one branch, the tibial process, bears the seminal duct.

128. *Gonokollesis nanus* n. sp.

(Pl. V, figs. 108-114.)

Colour earthy-brown. Width 0.45 mm. The animals are badly preserved.

Antennae (fig. 112) long; clavate; in the ♂ more so than in the ♀. Joints 2-7 with one or two long tactile bristles; all the joints densely covered with hairs. The fifth and sixth joints with a group of weakly

curved, blunt, sensitive spines (fig. 111). The seventh joint with a lateral prominence bearing pointed bristles. The last (eighth) joint with four normal cones (fig. 110).

The somites strongly constricted at the suture. The sides of the metasomites swollen, with one longitudinal ridge. The pores open dorsally close to this ridge near the posterior end; lateral keels are not distinct. Metasomites with three rows of bristles, each resting on a little knob. Collum with four rows of such bristles. On the sides and ventrally the metasomites are covered with little pointed cones. The posterior margin is finely pubescent in the middle of the ventral surface. The opening for the gonopods very large, oval; in front of the opening there is a narrow band. Sternites five and six in the ♂ without processes.

Tarsus and tibia of legs 1-8 with several rows of spheres intermixed with strong bristles; both are isolated, not connected to spherical bristles as in other genera; only on the extremity of the tarsus the spheres are sometimes prolonged (fig. 113). Posterior legs without spheres. Praefemur, femur, and postfemur with numerous curved dorsal bristles. One long bristle on the ventral side of coxa and prae-femur, and on the dorsal side of the tibia. Gonopods (figs. 108, 109): the coxae are coalescent, the median suture very distinct; the extremity projects a little laterally and the telopodite has the same axis as the coxa. The telopodites are also coalescent. In the basal part the margins are bluntly dentate. The femoral part is slightly incrassate, thence the gonopod is narrowed and bears some bristles on the aboral side. The extremity is divided into several branches; one large lateral branch (*a*), the bilobed branch with the seminal duct (*Sr*), and a trilobate branch (*b*) between "*a*" and "*Sr*."

Houw Hoek, Caledon (7362, 7336, 150104).

Gen. GNOMESKELUS nov.

Twenty segments. Pores present on segments 5, 7, 9, 10, 12, 13, 15-19. General appearance that of a *Strongylosoma*. Collum broadly rounded. The somites are moderately constricted at the suture, widest posteriorly. Suture smooth. Dorsum of metasomite generally smooth, without transverse furrow, rarely with one furrow and two rows of low protuberances behind the furrow. At the sides of the metasomite rounded prominences sharply defined dorsally, gradually vanishing ventrally. The posterior end either rounded or dentate. Posterior margin of the metasomite sometimes dentate. The pores opening dorsally near the posterior end. Anterior sternite

generally without processes, but in *G. globifer* with two rounded tubercles. Sternites all hairless, generally smooth, rarely granulated, with one transverse or with two cross impressions. Tail straight, pointed. The scale triangular or tongue-shaped and rounded. The extremity sometimes projecting a little. The valves with high but narrow margination; two bristles beside the lateral margin.

The anterior legs of the ♂ with spheres or cones on the under side; the coxae with or without these spheres. The gonopodial opening circular or oval; the posterior border raised, lamelliform. The coxae of the gonopods are coalescent; the extremity is not produced laterally. The telopodites are not coalescent. Telopodite joints without visible suture. The extremity is divided into the tibial process with the seminal duct and the tarsal branch, sometimes one or two lateral tibial branches. Tibial process and tarsus strong.

Key to the Species of Gnomeskelus.

- 1a. Joints 3, 4, 5 of the legs of segments 9-16 of ♂ enlarged at the extremity 2.
- 2a. The tarsus of these legs with two rounded prominences below, tibia without prominence and without tooth. Lateral keels rounded on all segments (1) *clavatus* n. sp.
- 2b. Tarsus and tibia of the legs of the segments 9-16 with a pointed tooth in the middle. The lateral keels pointed from the second segment and surpassing the posterior margin (2) *dentipes* Att.
- 1b. The legs without these peculiarities 3.
- 3a. Trunk blackish-brown, antennae and legs rose-coloured (3) *rhodobates* n. sp.
- 3b. Yellowish or brownish 4.
- 4a. Coxae of the anterior legs (3-7) with spheres; the lateral prominences of the metasomites are blunt teeth in the posterior half of the body, sometimes also in the anterior half 5.
- 5a. Metasomites with one transverse furrow and two rows of low, bristle-bearing protuberances behind the furrow (4) *terreus* n. sp.
- 5b. Metasomite without protuberances, generally also without furrow 6.
- 6a. Posterior margin of the metasomite not dentate. Sternites granular, without tooth near the posterior coxae. The protuberances of joints 1-5 of the legs are pointed cones and are present on the posterior legs also (5) *silvaticus* n. sp.
- 6b. On the posterior margin of the metasomite one or several pointed teeth dorsally. Sternites smooth; near the posterior coxae one pointed tooth. The protuberances are present only on the anterior legs and are spherical 7.
- 7a. On the posterior margin of metasomite 6 (on the poreless segments) or 8 (on the pore-bearing segments) acute teeth. Gonopodial tibia with one long slender lateral branch. Sternite 5 without tubercles (6) *natalicus* n. sp.
- 7b. Posterior margin of segments 9, 10, 12, 13 with one, segments 15 and 16 with two teeth on each side, on segments 17-19 several teeth. Gonopodial tibia with one short tooth on the median and lateral side. Sternite 5 with two low tubercles between the posterior legs (7) *globifer* n. sp.

- 4b. Under side of the coxae of the anterior legs without spheres or cones . . . 8.
- 8a. Posterior angle of the lateral keels sharply tooth-like, beginning from the second segment ; next to it one or two small teeth on the posterior margin of the metasomite 9.
- 9a. In the middle of the gonopodial telopodite, laterally, a large bipartite spine. The telopodite is a simple broad sickle without lateral branches
(11) *spinifer* n. sp.
- 9b. Gonopodial telopodite with a small simple tooth on the tip of the straight middle part. The telopodite is biramous, a plate with dentated margin and a slender sickle with the seminal duct . . . (12) *globulatus* Att.
- 8b. Lateral keels of the anterior half of the body rounded posteriorly or with a blunt and short angle. No teeth on the posterior margin of the metasomite 10.
- 10a. Gonopodial telopodite with a densely spined lappet or a dentated sickle . . . 11.
- 11a. Lateral keels wholly rounded. Metasomite without transverse furrow, smooth. Gonopodial telopodite with a dentated sickle, connected with a smooth branch (9) *ceresinus* n. sp.
- 11b. Posterior angle of the lateral keels on the anterior segments blunt, on the posterior segments acute. Metasomite with a transverse furrow, behind this furrow two rows of areas. Gonopodial telopodite with a large broad lappet with numerous little teeth ; next to its base a smooth branch and laterally and mesially one branch (13) *penicillatus* Att.
- 10b. Gonopodial telopodite without dentated branches 12.
- 12a. The protuberances of joints 2-5 of the male legs are pointed cones, the gonopodial telopodite is bristled up to the tip of the tibia (8) *repandus* n. sp.
- 12b. The protuberances of the legs are hemispherical. The gonopodial telopodite is bristled up to two-thirds of the length. The coxal process of the second leg of the ♂ is unusually large, reaching nearly up to the middle of the praefemur
(10) *puteinus* n. sp.

129. (1) *Gnomeskelus clavatus* n. sp.

(Pl. V, figs. 115-118.)

Colour a uniform reddish-brown (but badly preserved). Width 1.7 mm. ; slender.

Collum broadly rounded laterally. The somites weakly constricted at the suture ; each metasomite enlarged posteriorly ; no dorsal transverse furrow ; smooth, hairless ; suture smooth. At the sides low prominences sharply defined dorsally, rounded posteriorly ; on the last segments they are not tooth-like. The pore opens dorsally to the prominence which is close to the posterior end. Fine pleural keel visible up to the tenth segment. Sternites smooth, hairless, all without processes ; scarcely impressed.

First leg 6-jointed ; joints 1-5 with one long and several short bristles, last joint densely pubescent. Second pair of legs : the first,

second, third, and fifth joints with one long bristle underneath, the fourth and fifth joints with several short hairs, the last (sixth) joint densely pubescent underneath. No styles present. The genital process of the male coxae short and broad, its tip distant from the terminal border (fig. 115). The spheres begin on the third pair; they are present on joints 2-6, especially numerous on the fifth and sixth joints where they occupy the whole ventral surface; on the fourth joint there are only a few spheres; on the third and second joints they are present only in the distal half. On the first joint no spheres (a difference between this and other species). Except for the last spheres of the sixth joint they are wholly spherical, without any point. The first and second joints of these legs have one long bristle, the last joint several bristles at the sides; the under surface is free. The eighth pair resembles the preceding ones. The legs of the ninth to sixteenth segments are different; the third joint is very long, and this and the fourth and fifth joints are abruptly enlarged at the tip, forming a rounded prominence on the under surface. These prominences increase from the third to the fifth pair. The last (sixth) joint has two rounded prominences on the under surface, the distal prominence bearing several spheres with a little point (fig. 117). The first and second joints bear one long bristle; the last joint is strongly bristled; the remaining joints hairless (fig. 116). The caudal process conical and pointed, moderately long; the anal valves with two bristles close to the high border. The genital opening in the seventh somite of the male circular; the posterior border raised as a low lamella. Gonopods (fig. 118): femur and tibia without visible demarcation. The tibia bears on the inner side one long distally directed branch (*b*). Suture between tibia and the little rudimentary tarsal process (*T'a*) not visible. The tibial process with the seminal duct long, strongly curved.

Mossel Bay (7418), Cape.

130. (2) *Gnomeskelus dentipes* n. sp.

(Pl. XXVI, figs. 564-566.)

Colour earth-brown; the antennae darkened. Width 2 mm.

The dorsum is rounded; metasomites smooth, very slightly uneven, leather-like, with transverse rows of little, pointed, posteriorly directed hairs. The cross furrow scarcely visible. The transverse suture smooth. The lateral keels begin on the second segment; the posterior corner is toothed and surpasses the posterior border of the

metasomites. The tooth is of nearly equal size until the 18th segment. On the pore-bearing segments there is a second little tooth on the medial side and their keels are bidentate. Lateral border of the keels moderately convex. The fringes on the posterior border of the metasomites like a fine saw. The posterior sternites wide, without processes or hairs, with cross impression. The first and second pairs of legs much weaker than the abruptly thickened subsequent pairs, without spheres. From the third pair all joints except the coxa densely beset with spheres. Coxa and praefemur with one long tactile seta. Praefemur in the basal half bearing simple sickle-like bristles, in the distal half pointed conical warts and cross-ribbed spheres. On the femur the warts and spheres are the same. On the postfemur, tibia and tarsus, spheres only; some bearing a little point. On the tarsus a little space at the tip is free; in the other joints the spheres occupy nearly the whole under side (fig. 566). The hairs are few in number and small; only the tarsus is densely haired. Tibia with one dorsal tactile seta. The 8th and 9th pairs have the same spheres as the 3rd-7th pairs. On the 10th-16th pairs the tibia and tarsus have a callus, the tibia near the end, the tarsus more remote from the end, and the spheres are present only on this callus. In the middle of the tibia and tarsus of the 10th-16th pairs a little tooth. The opening for the gonopods is large, oval, the anterior plate closing the opening very narrow. The coxae of the gonopods (figs. 564, 565) are connected. The hairs covering the seminal groove are short and few in number. The rest of the hairs of the femoral part somewhat longer. The tibial part is straight, moderately wide, then a little constricted and branched; the tibial process (*Tf*) is sickle-like, 2-pointed at the end, and bearing a large, rounded lamella on the base. The second branch is also sickle-like, slender, and simple.

Masiene, Chai Chai (5998, 6004), Portuguese E. Africa.

131. (3) *Gnomeskelus rhodobates* n. sp.

(Pl. V, figs. 119-121.)

Colour: head and trunk blackish-brown, nearly black; antennae and legs rose-coloured. Width 2.6 mm.

Head hairless; antennae long, club-like. Sides of the collum broadly rounded. The somites constricted by the smooth suture. The sides of the metasomite swollen, beginning gradually from the suture; the posterior end of these plates is blunt, only becoming a little sharper on the eighteenth and nineteenth segments. The

posterior half of the plate is defined by a sharp groove beginning on the posterior border of the metasomite and gradually disappearing in the middle. At the sides of the plates one delicate ridge. The pore opens dorsally to this ridge near the posterior end. Posterior margin of the metasomites without denticulations. Sternites without prominences.

Praefemur, femur, and tibia of legs 3-8 with high, smooth, pointed cones. The coxae of the third and fifth pairs with several cones (fig. 119); coxae of the remaining legs without cones; the tibia and tarsus with numerous striated spheres (fig. 121); in the proximal half of the tibia these spheres are somewhat conical, and striated. Gonopods (fig. 120): the coxae coalescent; distal surface of coxae oblique; the telopodite without trace of articulation. The base is swollen; the hairs are relatively sparse and extend to the end of the straight basal part of the telopodite; the tip is strongly curved inwards, crossing with the opposite gonopod. In the middle of the semicircle one short, rounded lamella. The tip is forked, the slender branch bearing the seminal duct.

Coldstream, Humansdorp (B. 5297, B. 5304), Cape.

132. (4) *Gnomeskelus terreus* n. sp.

(Pl. V, figs. 122-124.)

Colour earthy-brown. Width 1.5 mm.; slender.

Antennae long and slender, the tip a little clubbed. Collum elliptical, the sides rounded and lying close to the body. Segments three and four a little narrowed. The dorsal surface of the metasomites is divided by a transverse furrow: in front of this furrow is one row of six bristles, each resting on a minute knob; behind the furrow two rows of six low prominences bearing one bristle each. The sides of the metasomites a little swollen; on this callosity a fine ridge with 2-3 weak bristle-bearing notches. The posterior end of the callosity is tooth-like from the fifth segment onwards. On the pore-bearing segments the outer tubercle of the last row is dentiform and the pore opens between this tubercle and the tooth of the callosity. The pleural keel present up to the seventeenth segment. Sternites smooth, without processes.

The legs of the ♂, especially the praefemur and femur, are incrassate; the base of the femur is narrowed like a handle: coxae and praefemur with one long bristle below, tibia with one above. All joints, including the coxae, bearing spheres; these are a little conical on the four proximal joints; the spheres of tibia and tarsus furrowed. The

hairs are sparse. Two long bristles above the terminal claw. Gonopods (figs. 123, 124): the opening on the seventh somite is large, transversely oval. The coxae are coalescent, but their median border not raised. The tibia is cylindrical and straight, and sparsely pubescent on the inner side. Then follows a rounded plate bearing the terminal branches: the tibial process with the seminal duct, one pointed, straight lamella (*B*), and two divergent branches united at the base, probably the homologue of the tarsus (*Ta*).

Howick (150174), Natal.

133. (5) *Gnomeskelus silvaticus* n. sp.

(Pl. VI, figs. 125–128.)

Colour blackish; the keels, one narrow longitudinal band on the prosomites, the anterior half of the metasomites, and two transverse irregularly defined patches on the posterior half of the metasomite white or yellowish. The legs reddish-brown. (The animals are badly preserved and the original colour not recognisable.) Width: metasomite 3.2 mm., prosomite 2.6 mm.; length 20 mm.

Head covered with scattered hairs. Sides of the collum rounded. The keels are well developed; the anterior and posterior corners are rounded on segments 2–4; on the following segment the posterior corner becomes more and more tooth-like, and dorsally it is accompanied by a deep furrow beginning on the posterior margin and disappearing in the middle. The keels bear one fine lateral ridge; the pore opens dorsally from this ridge, close to the posterior end. The metasomites from the sixth with one weak transverse furrow; behind this furrow they are slightly wrinkled; the transverse suture is slightly striated longitudinally, but not distinctly beaded. Pleural keel visible to the fifteenth segment. Sternites granular, with one deep transverse impression without processes.

First and second pairs of legs with several needle-like points on the praefemur and femur. The ventral side of all the joints of the following legs covered with protuberances—pointed cones on joints 1–5 (fig. 176), spheres on the last joint; a short terminal piece of the latter has no spheres. Hairs are present on the last joint. The legs in the middle of the body (nineteenth and twentieth pairs, fig. 128) resemble the anterior legs. The last joint is long, slender, and slightly curved. The opening for the gonopods is nearly circular; the posterior border is raised, lamelliform, of even height, with one notch in the middle. Gonopods (figs. 125, 127): the telopodite but little

incrassate at the base; the femur and tibia not separated, the whole telopodite in one piece; the basal part cylindrical and straight; at the beginning of the curve is one strong tooth (*z*); the tibial process (*Tf*) is a little lappet, close to it one slender style. The tarsus (*Ta*) is much larger.

Forest at Knysna (1551, B. 2441), Cape; Inchanga (B. 3382), Natal.

134. (6) *Gnomeskelus natalicus* n. sp.

(Pl. VI, figs. 129–132.)

Colour blackish-brown, partly chestnut; the original colour not recognisable on account of the bad state of preservation. ♂ width 2 mm.

Head-plate pubescent; antennae long, clubbed. The sides of the collum evenly rounded and pressed close to the body. The somites are visibly constricted by the smooth, not beaded, transverse suture. Lateral keels are present from the second segment onwards. At the side of the keel one fine ridge ending in a sharp tooth which projects beyond the posterior margin. On the posterior margin of the metasomites from the fourth backwards, six (on the poreless) or eight (on the pore-bearing segments) sharp little teeth similar to the teeth on the keel, diminishing gradually towards the middle of the dorsum (fig. 132). The pore opens between the tooth of the keel and the following marginal tooth. On the posterior margin of the metasomite a finely fringed border resembling that of the *Odontopygidae*. No transverse furrow on the metasomites; surface smooth. Anterior sternites without processes; posterior sternites broad, with one weak mammiform prominence close to each coxa. Pleural keels present up to the seventeenth segment. Caudal process conical, pointed, straight, moderately long. The margination of the anal valves narrow. The anal scale projects, and is conical as seen in profile.

The legs are slender, the last joint long. In the ♂ the praefemur and femur of the first and second pairs of legs with several conical warts; the ventral surface of all the joints of the third to seventh pairs (fig. 131) with spherical warts. They are numerous; on the last joint only a little terminal piece is free of them. Coxa and praefemur on the ventral side and tibia above with one long bristle. The posterior legs have no spheres, but are only hairy. The opening for the gonopods ovate or nearly quadrangular with rounded corners; the plate before the opening is very narrow; the posterior border is

raised and lamelliform with a weak notch in the middle. Gonopods (figs. 129, 130): the coxae are coalescent, but the suture remains visible. On the lateral side one tapering lamella (*d*), the base of the telopodite slightly swollen; the whole telopodite is a single piece ending in three branches. The broadest branch is the tibial process (*Tf*) with the seminal duct; on the lateral side rises one slender branch (*g*) belonging to the tibia. The large branch (*Ta*) represents the tarsus. All these branches are directed inwards and cross those of the opposite side.

Krantzkop (B. 3390), Natal.

135. (7) *Gnomeskelus globifer* n. sp.

(Pl. VI, figs. 136-140.)

Colour earthy-brown. ♂ width 2.2 mm.

Collum with three, the following segments with two rows of little hairs, disappearing gradually. The keels are narrow and edged, ending with a sharp tooth passing the posterior border. On the posterior border of metasomites 9, 10, 12, 13, close to this tooth, a second little tooth; on segments 15 and 16 two, and on segments 17, 18, 19 a row of teeth continued along the whole border. Sternite five with two low, rounded tubercles between the posterior legs. Sternite six without prominence. From the twelfth onwards the sternites are transversely impressed and have one little prominence divided backwards close to the coxae of the posterior pairs of legs.

The legs are long and slender. In the ♂, joints 1-5 of the first and second pairs of legs with fine and short pubescence, with one long tactile bristle below. The last joint with denser hairs. The fourth and fifth joints of the second pair with several papillae and cones. The genital process short, scarcely projecting (fig. 137). Joints 3-7 with spheres on all joints (also on the coxae). The spheres are finely striated (fig. 139) and some are pointed, but most of them are not. The hairs between the spheres sparse on all joints. The posterior legs have no spheres; the fifth joint with one long bristle on the upper side, the last joint with short, dense hair. The posterior border of the gonopodial opening is raised, with a notch in the middle of the lamella (fig. 140). Gonopods (fig. 136): the coxae are coalescent throughout their length. The femoro-tibial part is long, slender, without suture between the two parts; the pubescence is sparse. At the beginning of the curve are two lateral branches, the external one with two teeth, the internal one plain. The long tibial process is curved inwards.

The broad branch (*Ta*) is perhaps the tarsus; its tip is dentate (fig. 138).

Dunbrody on the Sundays River, Uitenhage Div. (7379).

136. (8) *Gnomeskelus repandus* n. sp.

(Pl. VI, figs. 141–146; Pl. VII, fig. 147.)

Colour: metasomites a light chestnut, bordered with dark brown behind; prosomites pale yellowish; antennae brown, legs yellow. Width: ♂ 2.3 mm., ♀ 2.8 mm.

Surface of the body smooth, hairless. The keels are represented by narrow thickenings, rounded behind, sharply defined dorsally by a furrow. The pores open close to the posterior end and dorsally from the thickening. The keel of the second segment lower ventrally than the collum, forming an oblique line with the keels of the third and fourth segments; its posterior end bluntly lobed. Transverse suture smooth. Pleural keels visible on the anterior half of the body. Sternites slightly wrinkled, hairless, the anterior sternites without processes.

First and second joints of legs 1 and 2 with one very long bristle and some shorter hairs, joints 3–6 with long and strong hairs. The genital process large, but not reaching the terminal margin of the coxa, bearing a little shiny papilla and some short hairs (fig. 146). Pairs 3–7 (fig. 141) with blunt conical warts on the second to the last joints (the coxa has no warts); the warts of the last joint more numerous, but not completely rounded. All are finely striated. First and second joints with one long bristle below; fifth joint with several bristles above, the last joint more densely pubescent. The end of the second and fifth joints of the eighth and following pairs of legs swollen and beset with several conical warts below; joints 3, 4, and 6 also beset with warts; these warts become more and more spine-like; on the last joint they are typical sphere-bristles, a claw-like bristle with a spherical base. The posterior border of the gonopodial opening is raised to form a lamella with a notch in the middle (fig. 147). Gonopods (figs. 142–145): the coxae (figs. 143, 144) are close together, and the small space between them is bridged by a broad plate; the distal plane of the coxae is oblique, laterally longer than internally. The basal half of the telopodite is straight, pubescent (fig. 145). The tibial process is large, strongly curved inwards, near the base one little dentate lamella (1), at the end a little tooth (fig. 142); the tarsus is directed laterally, its end finely dentate and bearing one strong tooth.

This is the commonest species of the genus.

Cape Province.—Houw Hoek (7356); Kalk Bay (150115, 150121) (1641); Simonstown (7718, 7622, 7727); St. James (7716, 7708); Swellendam (7655); Caledon (14659); Venster Ravine, Caledon (7370, 7373); Cape Flats (B. 930); Pass at Avontuur (7331); River Zonder End (B. 5272).

137. (9) *Gnomeskelus ceresinus* n. sp.

(Pl. VI, figs. 133–135.)

Colour: metasomites chestnut, prosomites yellowish-brown (badly preserved). Width 1.7 mm.

Head densely pubescent. Collum broadly rounded (as usual). The keels are narrow thickenings rounded posteriorly, sharply defined dorsally by a furrow. The second keel is ventrally lower than the collum and the third of its posterior end a little angular. The large pores open dorsally to the thickening near its posterior end. Metasomites without transverse furrow. Transverse suture smooth. The trunk hairless, dorsally smooth, the sides slightly wrinkled. Sternites hairless, the anterior without processes, the posterior with cross-shaped impressions; narrow, quadrate. The pleural keels visible up to the sixteenth segment.

In the ♂, joints 1–5 of the first pair of legs with one bristle, especially long on the second joint. The last joint short and broad, with strong bristles. Second and third joints of the second pair with several blunt papillae, fourth and fifth joints with a few spherical bristles; the genital process short, rising nearly on the terminal margin of the coxae, beset with one spine and several bristles (fig. 135). Pairs of legs 3–7 with warts on the second to the last joints. These warts are longer on the third joint, spherical with a little point on the last joint. The tactile bristle on the first and second joints remarkably long. The last joint abundantly hairy. The posterior legs bear warts on joints 3–6, but there are none on the last third of the sixth joint. Gonopods (figs. 133, 134): the coxae are connected by a narrow bridge. The telopodite is not much swollen at the base; hairs are present only on the femoral piece (not defined from the tibial piece by suture or anything like it). The tibial process is curved inwards and its tip is bifid. The tarsus is biramose. One branch is plain; the distal branch is dentate, resembling the gonopod of *Polydesmus edentulus*.

Cape Province.—Ceres (7525); The pass at Avontuur, near Storms Vlei; Swellendam (7372).

138. (10) *Gnomeskelus puteinus* n. sp.

(Pl. VII, figs. 148-150.)

Colour now dirty yellow or earthy-brown, probably altered by alcohol. Width 1.7 mm.

Head-plate covered with dense, short, and fine hairs. Collum with three rows of fine hairs. Metasomites with two rows of hairs, smooth, no transverse furrow. Transverse suture smooth; the somites are visibly constricted by the suture. Each metasomite is enlarged posteriorly. The keels are small thickenings, sharply defined by a furrow dorsally, rounded posteriorly; further, the last keels have no tooth-like projections posteriorly. The keel of the second segment is somewhat pointed behind. The pleural keels are visible up to the eighth segment. Sternites without peculiarities or processes, etc.

First pair of legs of ♂ with one long bristle on the under side of joints 1-5. The last joint with strong scattered bristles below. The genito-coxal process of the second pair (fig. 150) is remarkably long, extending to the middle of the second joint, thick, tapering. The second joint below, and the fourth and fifth joints above, with one long bristle each. Third to sixth pairs of legs with spherical bristles on the under side of joints 2-6 (coxa without spheres); the spheres few in number; the beginning of the last joint naked. Seventh and eighth pairs with several spheres on the third joint, and more numerous ones on the fourth, fifth, and the distal half of the sixth joint. The posterior legs are slender and have no spheres; the last joint richly pubescent, the remaining joints very sparsely pubescent. The gonopodial opening is ovate; the posterior lamella raised and notched in the middle. Gonopods (figs. 148, 149): the coxae coalescent, the base of the telopodite much swollen and the pubescence a little denser than usual. The tibial process strongly curved inwards and bifid at the extremity. The tarsus is a broad plate with a long and strong spine directed laterally.

Matjesfontein (13482), Cape.

139. (11) *Gnomeskelus spinifer* n. sp.

(Pl. XXI, figs. 501, 502; Pl. XXVI, fig. 568.)

Colour earth-brown. Width 1.5 mm.

The dorsum rounded, smooth (fig. 501); the lateral keels are narrow crests; the posterior corner of these crests is toothed, beginning

from the second segment, and surpasses the posterior border of the metasomite. Besides this tooth, on the anterior segments one, on the posterior segments two little teeth (fig. 502); lateral border of the crests smooth. Transverse suture smooth. The fringes on the posterior border of the metasomites like a fine saw. The cross furrow not visible. The metasomites have no transverse rows of setae (perhaps they are lost by bad preservation). The anterior sternites without processes. The first pair of legs with some spheres on the praefemur. The second pair with some spheres on all joints beginning from the praefemur. From the third pair all joints except the coxa densely beset with spheres. The spheres in part bearing a little point. Only few hairs between the spheres. The posterior legs have some spheres only on the praefemur and femur.

The coxae of the gonopods (fig. 568) are connected, but they can easily be separated; the telopodite is slender. The basal part is greyish-white, beset with few and short hairs; the following part bears some hairs on the inner side; it is then branched; one branch is the long-curved tibial process; the tip of this process resembles a bird's head. The second branch is short, straight, and 2-pointed.

Masiene, Chai Chai, Portuguese E. Africa (5991, 5998, 6007, 6004, 6009).

140. (12) *Gnomeskelus globulatus* Att.

1927. Attems, Ann. Nat. Mus. Wien, xli, p. 58, figs. 12, 13.
Grahamstown.

141. (13) *Gnomeskelus penicillatus* Att.

1927. Attems, Ann. Nat. Mus. Wien, xli, p. 58, figs. 10, 11.
Mossel Bay, Cape.

Gen. PHILOCAFFRUS nov.

Twenty segments. Pores present on segments 5, 7, 9, 10, 12, 13, 15-19. General appearance that of a little Palaearctic *Polydesmus*. Colour generally earthy-brown, rarely dirty yellow. Collum as broad as the head, elliptical. Metasomites with well-developed keels. The surface of the dorsum slightly arched, that of the keels nearly horizontal. The sides of the keels bordered by a fine edge and weakly notched, with one bristle in each notch. The pores open on the upper surface close to the lateral edge and to the posterior end. Metasomites with three rows of bristles springing generally from low

tubercles; the posterior margin of the metasomites beset with branched pyramids or ramose fringes. Caudal process straight, conical. Sternites all without processes. Tarsus and tibia of the anterior legs of ♂ always, the postfemur generally, praefemur and femur always, with spherical bristles. The postfemur, if the sphere-bristles are wanting, has instead strong sickle-shaped bristles.

The gonopodial opening ovate, the long axis transverse or longitudinal. The coxae of the gonopods lie close together and sometimes coalesce, but can be separated by a little pressure. The coxae do not project on the lateral side; the telopodites are not coalescent, and each consists of one piece; the basal portion (=femur) is swollen and hairy, and passes without a break into the tibial portion. The tibia at the tip has sometimes, besides the tibial, one or two lateral processes. The tarsal portion generally simple, sometimes branched.

Key to the Species of Philocaffrus.

- 1a. Postfemur of the anterior legs of male with sickle-shaped bristles like those of the praefemur and femur, without spherical bristles *destitutus* n. sp.
- 1b. Postfemur of the anterior legs with spherical bristles like those of the tarsus 2.
- 2a. At the tip of the gonopodial telopodite, besides the tibial process with the seminal duct and the tarsus, there are two processes. Lateral branch of the tibial process with several points; tarsus 4-branched. (Metasomites with rows of tubercles, the hairs of the dorsum pointed, long axis of the gonopodial opening transverse) *divisus* n. sp.
- 2b. At the tip of the gonopodial telopodite, besides the tibial process and the tarsus, no lateral branch or only one very small tooth. Lateral ramus of the tibial branch simple or wanting. Tarsus simple 3.
- 3a. The bristles of the metasomites are club-like and bear little hairs on the club. Metasomites with rows of low tubercles. The long axis of the gonopodial opening transverse *polydesmoides* n. sp.
- 3b. The bristles of the metasomites are simple and pointed; metasomites without tubercles. The long axis of the gonopodial opening is longitudinal *bifalcatus* n. sp.

142. *Philocaffrus destitutus* n. sp.

(Pl. VII, figs. 151-154.)

Colour dirty yellowish-white. ♂ width 1.2 mm.

Clypeus densely covered with short hairs. Antennae slightly clubbed. Collum elliptical, the rounded sides pressed to the trunk. The dorsum is moderately arched, the keels rising above the middle of the sides and well developed. On the second to the fourth segment they are rounded anteriorly and posteriorly; from the fifth segment the posterior angle becomes sharper and sharper, exceeding the posterior

margin of the metasomite. At the sides of the keels a fine ridge with 3-4 little notches bearing one bristle each; these bristles are slender and pointed. Metasomites 4-18 with a very distinct transverse furrow, but without rows of tubercles. The dorsal bristles are blunt and sometimes beset with minute hairs. The posterior border of the metasomites is beset with curious fringes (fig. 153) resembling little trees with short stumpy branches. At the sides only little warts or cones. The transverse suture smooth. Sternites five and six without process.

In the male the coxa and praefemur of the anterior legs with one long bristle below, tibia with one bristle above. Praefemur, femur, and postfemur below with strong, blunt, falcate bristles, less numerous than in *P. polydesmoides*. The tarsi with spherical bristles. The legs covered as well with long, scattered hairs. The anterior legs are incrassate, but less so than in *P. polydesmoides*. The posterior legs are simply pubescent. The long axis of the gonopodial opening is longitudinal (a rare case). Gonopods (figs. 151, 152) much resembling those of *P. polydesmoides*. The coxae lie close together, but are easily separated. The telopodite is long and slender, the basal femoral portion moderately swollen; the tibia, as far as the bifurcation, straight and with a few hairs. The tibial process has one simple lateral lobe. The tarsus is broad and simple (without branches). The whole telopodite consists of one piece; the component portions are not defined by sutures, etc.

Steenbrass River, Caledon Div. (A. 2326), Cape.

143. *Philocaffrus divisus* n. sp.

(Pl. VII, figs. 155-159.)

Colour of ♂ dark earthy-brown. Width 1.5 mm.

The whole head-plate densely covered with fine-pointed hairs. The antennae strongly clubbed. The keels are small but well developed; they rise at the upper part of the sides, and the dorsum is slightly arched. Side margin convex and bordered by a fine edge with 3-4 weak notches. The posterior angle is rounded to the fourth segment, pointed from the fifth. The pores open close to the lateral edge near the posterior angle. Metasomites with three rows of tubercles bearing one short, clubbed bristle each. The fringes on the posterior margin are irregular cones beset with little tubercles (fig. 158).

The legs of the male, excepting the last, are incrassate. Praefemur

and femur with slender, handle-like base, strongly projecting and rounded above. Coxa and praefemur below and tibia above with one long bristle. Coxa, praefemur, and femur with falcate bristles; on the coxa only a small group, on the praefemur and femur numerous and dense. On the sternite in the vicinity of the coxae are some sickle-shaped bristles. Postfemur, tibia and tarsus with spherical bristles. The spheres sometimes a little conical, indistinctly striated, the bristles rising from the spheres short. The pubescence of the tibia and postfemur weak, of the second tarsus dense. The gonopodial opening regular, ovate, the long axis transverse, not much longer than the short axis. The posterior border not visibly raised. Gonopods (figs. 155-157): the coxae are weakly coalescent and can be separated with a little pressure. The bases of the telopodites are contiguous but not coalescent; the basal femoral part is richly pubescent on the aboral side and passes without a suture into the long slender tibial part. At the tip of the tibia four branches; on the oral side one strong spine (*a*), on the aboral side one shorter spine (*b*). The tibial process (*Tf*) is short and broad and divided into the branch with the seminal duct and several sharp teeth. The fourth branch is the tarsus, divided into four arms.

Gt. Winterhoek (B. 2233), Cape.

144. *Philocaffrus polydesmoides* n. sp.

(Pl. VII, figs. 160-167.)

Colour reddish-brown. Width 2.2 mm., length 15 mm.

Resembling in colour and appearance our European *Polydesmus denticulatus*. Clypeus densely, vertex sparsely covered with short hairs. The antennae but little incrassate or clubbed; the papillae on the fifth and sixth joints in a little group on the surface. The seventh joint with a little knob beset with short, pointed, partly curved hairs. Collum as broad as the head, laterally narrowed; the sides pressed to the body (fig. 164), the surface with several irregular rows of bristles. The keels (fig. 162) well developed, rising high, the dorsum nearly horizontal, the surface of the keels bladder-like and raised. The lateral margin weakly curved, with 3-4 bristle-bearing notches. The posterior angle pointed and overlapping the posterior margin from the fourth or fifth segment, the length of the tooth increasing as the segments are followed backwards. The pores open on the dorsal surface close to the lateral margin. Metasomites with three rows of very low tubercles each bearing one bristle. These

bristles and the lateral bristles are clubbed and beset on the club with very fine hairs (fig. 165). The marginal fringes of the posterior margin (fig. 165) are broad, the sides finely serrulate; in the middle of each fringe a series of 2-4 small knobs. Sternites quadrate, with deep transverse impression, pubescent; all sternites without processes.

♂ with first and second pairs of legs densely bristled; coxa and praefemur below, tibia above, with one very long bristle. From the third pair the praefemur and femur are densely covered on the ventral surface with short, curved, falciform bristles (figs. 163, 167), the post-femur, tibia and tarsus with spherical bristles (fig. 166). The praefemur and femur are strongly protuberant on the upper side, the base abruptly narrowed. The gonopodial opening very large, nearly circular, the plate before the opening very narrow. Gonopods (figs. 160, 161): the coxae without peculiarities; the base of the telopodite moderately swollen and hairy, gradually tapering to the point of bifurcation into the tibial process (*Tf*), with one little lateral lobe, and the tarsus (*Ta*) a rounded curved plate.

Caledon (14661), Cape.

145. *Philocaffrus bifalcatus* n. sp.

(Pl. VII, figs. 168-172; Pl. VIII, figs. 173, 174.)

Colour earthy-brown. Width 2 mm., length 16 mm.

Antennae moderately clubbed. The collum elliptical, the sides slightly raised. The keels well developed, rising strongly, the dorsum in the middle slightly elevated above the surface of the keels. Lateral margin of the keels convex, bordered by a very fine ridge with 3-4 weak notches, each bearing one bristle. The bristles are present only on the collum and anal segment and in a few notches of the sides. The posterior angle of the keels of the 2nd-4th segments rounded. From the fifth the angle becomes more and more pointed. The surface of the keel is occupied by a swelling. The dorsum of the metasomites, except the first and last segments, with one transverse furrow; the surface behind the furrow with two curved striae, but without rows of tubercles. The dorsal bristles are slender and pointed. The pores open close to the fine lateral edge; on the median side of the pore one short ridge. Sternites narrow, longer than wide, deeply impressed transversely, all without processes.

The legs of the ♂ are incrassate, except the last two pairs; the first and second pairs with some falciform bristles on the praefemur and femur: without spherical bristles. From the third pair the prae-

femur and femur are swollen above, and densely beset with short, blunt, falciform bristles below. The postfemur, tibia and the tarsus are beset below with spherical bristles (figs. 169, 170). The spheres are large and weakly striated; the bristles rising from them are short. The spherical bristles of the posterior legs are somewhat different, the sphere and the bristle being further apart (fig. 174). The long axis of the gonopodial opening is longitudinal. Gonopods (fig. 173): the telopodite is long and very slender, little swollen at the base, with scattered pubescence up to the ramification. The tibial process is small, curved, the tarsus larger, curved, and simple. One minute tooth near the base of the tarsus.

Table Mt. (B. 2228), Cape.

Gen. HARPETHRIX nov.

Twenty segments. Pores on segments 5, 7, 9, 10, 12, 13, 15-19. The general appearance of a *Polydesmus*: the dorsum flat, with rows of tubercles. The keels well developed, angular and rising high. The legs of the ♂ without cones or spheres, only hairy. The gonopods much like the gonopods of *Gnomeskelus*: the coxae short, lying close together. The telopodite straight, the femorite hairy, the tibio-tarsus long and slender, divided into several arms at the tip. The opening for the gonopods very large, circular. The gonopods so much resemble those of *Gnomeskelus* (e.g. *puteinus*) that I put *Harpethrix* with the *Sphaerotrachopidae* in spite of the absence of the spheres and cones on the male legs.

146. *Harpethrix plana* n. sp.

(Pl. XXI, figs. 507-512.)

The head densely covered with short hairs. The antennae long, club-like. The collum broader than the head, the anterior and lateral margin forming a semicircle, the posterior margin straight; along the anterior and posterior margin a row of bristles, and on the surface three rows. The lateral expansions or keels rising high on the sides, the dorsum therefore flat. The keels are angular, the anterior margin transverse, the lateral margin weakly convex, the posterior angle forming a right angle on the anterior segments and becoming more and more tooth-like on the later ones. The pores very small, near the posterior angle on the upper side. Metasomite with three cross-rows of tubercles, four in the first and second rows, six in the third row. The posterior margin of the metasomite beset with simple, pointed fringes (fig. 511). The sternites and the legs without peculiarities.

The legs (fig. 509) beset with adpressed short bristles ; on the dorsal side the bristles are sickle-like. The opening for the gonopods very large, circular (fig. 508). The coxae of the gonopods (fig. 512) short and broad, close together, laterally more prominent than medially. The telopodite inserted on the tip of the coxa, not in an angle on the inner side. The base of the telopodite, the femorite, rounded and hairy. The following part suddenly narrowed, but not marked off by a suture. This tibio-tarsus very long and slender, the tip divided into three arms, namely, two triangular lobes, and between them the slender arm bearing the seminal canal. The tibio-tarsus is beset with numerous little pointed cones (fig. 507).

Witte River (5330), Wellington, Cape.

Gen. STENAUCHENIA Att.

1901. Attems, Neue Polyd. Hamb. Mus., Mitt. Nat. Hist. Mus., xviii, p. 95.

147. *Stenauchenia braunsi* Att.

1915 *Loc. cit.*, p. 96.

Port Elizabeth, Cape.

The systematic position of this genus is very doubtful, because only a female is known, and we must hope that the male will be found in order to determine its position.

[*Polydesmus (Icosidesmus) humberti*, Porat, Öfvers. Vet. Ak. Förh., 1872, Nr. 5, p. 11, from Caffraria, is not recognisable, the description not being accompanied by illustrations.]

Fam. GOMPHODESMIDAE.

1895. Cook, Ann. N. York Acad. Sci., ix, p. 4.

1895. Cook, Proc. U.S. Nat. Mus., xviii, p. 82.

1899. Cook, *Ibid.*, xxi, p. 678.

1914. Attems, Indo-Austral. Myr., p. 278.

1915. Brölemann, Ann. Soc. Ent. France, lxxxiv, p. 565.

1926. Attems, Kükenthal's Handb. d. Zool, iv, p. 149.

The coxae of the gonopods weakly united. The telopodite inserted at the tip of the coxae, the latter not forming any large prominence on the lateral side ; the telopodite consisting of one piece, the parts not separated by sutures, etc. ; no angular break between the femoral and tibial part ; the telopodite generally (in all *Gomphodesminae*) very long, strongly curved, no distinct tarsal portion visible. Below the terminal claw of the male legs generally one soft process (wanting

in *Antiphonus* and ? *Harmodesmus*). Pores present are on segments 5, 7, 9-19 (all genera of *Gomphodesminae*), or 5, 7, 9, 10, 12-19; or 5, 7, 9, 10, 12, 13, 15-19; or 5, 9, 10, 12, 13, 15-19. Terminal joint of the antennae generally with four, sometimes with ten olfactory cones. Posterior sternites (15 or 16) sometimes with processes. Caudal process conical. Twenty segments. Genera of large or medium size.

This family was divided by Cook into two subfamilies; only the *Gomphodesminae* are represented in South Africa.

Key to the Genera of Gomphodesminae.

- 1a. Last joint of the antennae with 10 olfactory cones 2.
- 2a. Coxa of second leg of ♀ with a ventral, cylindrical, densely bristled process, projecting beyond the praefemur *Merodesmus* Ck.
- 2b. Coxa of second leg of ♀ without such process 3.
- 3a. Sternite of segment 15 of the ♂ without a process, the gonopodial telopodites lying in a cavity of the ventral side of the seventh segment
Sphenodesmus Ck.
- 3b. Sternite of segment 15 of the ♂ with a triangular process. The gonopodial telopodites not sunk in a cavity 4.
- 4a. On the medial side of the node of the gonopodial tibia two long, slender spines. Lateral lobes of the collum smaller than the lobes of the second segment
Sigodesmus Ck.
- 4b. On the medial side of the node no spine. Lateral lobes of the collum as large as, or larger than, the lobes of the second segment . . . *Astrodesmus* Ck.
- 1b. Last antennal joint with 4 olfactory cones 5.
- 5a. Telopodite of the gonopod without any lateral branch, forming a simple spiral. Anterior legs without distinct claw pads *Antiphonus* Attems.
- 5b. The gonopodial telopodite bears behind the first strong curvature one or more spines or lobes, and the tip is bifurcate 6.
- 6a. Tarsus without claw pads. On the tip of the first straight bristled part of the gonopodial telopodite a lateral branch. Pores present on segments 5, 7, 9, 10, 12-19 *Schizogomphodesmus* Bröl.
- 6b. Anterior legs with a claw pad. The lateral branch of the gonopodial telopodite rising distally from the first curve. Pores present on segments 5, 7, 9-19 . . . 7.
- 7a. The tibio-tarsal part of the gonopodial telopodite short, nearly straight (not twisted or strongly curved) 8.
- 8a. Sternite 16 with a conical process between the posterior legs
Tycodesmus Cook.
- 8b. Sternite 16 without processes *Mychodesmus* Cook.
- 7b. The tibio-tarsal part long, S-shaped or forming a spiral 9.
- 9a. Sternite 15 with a conical process from the anterior edge
Aulodesmus Cook.
- 9b. Sternite 15 without a process 10.
- 10a. The distal part of the gonopodial telopodite, after the first curve, without a strong plate-shaped enlargement, with only one or two strong spines; the gonopod describing one or more complete circles . . . *Ulodesmus* Cook.

- 10b. The gonopodial telopodite strongly enlarged in the tibial part, with one or more spines; the tip shorter and weakly curved or, if longer, S-shaped (not describing a circle) 11.
- 11a. The distal part of the gonopod long, strongly recurved laterally and expanded and hollowed out *Neodesmus* Cook.
- 11b. The distal part of the gonopod shorter, not bent laterally and not hollowed out like a spoon *Gomphodesmus* Cook.

Gen. ANTIPHONUS Attems.

1901. Attems, Neue Polyd. Hamb. Mus., Mitt. Nat. Hist. Mus., xviii, p. 101.

Twenty segments. Pores present on segments 5, 7, 9–19. Telopodite of the gonopods very long, forming a spiral without any lateral teeth or lobe. Anterior male legs without pads under the terminal claw or with rudimentary pad. Sternite six with one or two processes between the anterior legs. The remaining sternites without processes or transverse ridges. The keels small, especially in the posterior part of the body; the anal segment completely visible, the keels of the nineteenth segment being very small. Collum as wide as the second segment. Antennae with four olfactory cones. Labrum densely bristled.

Key to the Species of *Antiphonus*.

- 1a. Sternite 6 with one triangular process between the anterior legs (the pore-bearing keels conical as seen from above; the pore opening on the tip of the cone, directed laterally) *conatus* n. sp.
- 1b. Sternite 6 with two processes between the anterior legs 2.
- 2a. All the pore-bearing keels are nearly as long as the metasomite and the pore is located in the middle of this callosity. The posterior end of the keel, especially on the posterior segment, is pointed. The gonopodial telopodite describes one spire with an enlargement in the middle. The processes of the sixth sternum are broad, rounded lamellae *circulus* n. sp.
- 2b. The pore-bearing keels are reduced to little rounded warts near the posterior end, with the pore and a small ridge in front. The gonopodial telopodite describes a complete spiral with $2\frac{1}{2}$ spires, in the middle no enlargement. The processes of the sixth sternum are conical *diploconus* Attems.

148. *Antiphonus conatus* n. sp.

(Pl. VIII, figs. 175–179.)

Colour (now) dirty yellowish-brown. Width: metasomite 3 mm., prosomite 2.5 mm.

Antennae slender. Clypeus anteriorly densely covered with hairs, the remainder of the head-plate hairless. Collum nearly as wide as

the following segment, the sides broadly callous, the anterior and posterior margins finely bordered. The keels of the pore-bearing segments are horizontal blunt cones (fig. 177). The pore opens on top of the cone, which is somewhat callous. The upper surface of the keel is roughly wrinkled. The keels of the poreless segments (2-4, 6, 8) are longer seen from above, not conical, with a lateral callosity (fig. 179). Transverse suture weakly striated longitudinally. Pleural keel visible up to the seventeenth segment. Caudal process tapering and broadly truncate. The bristles are located in little pits, not on warts. Anal scale arched, two tubercles next to the point. The nineteenth segment very short, the keels represented by small, low tubercles. Sternite six with one triangular hairy process between the anterior legs. The posterior sternites without processes and transverse edges. The posterior border beset with a row of long bristles.

The anterior legs have no pads beneath the claw; the latter is of normal size. Gonopods: the gonopodial opening (fig. 178) pointed at the sides; the lateral borders raised, the anterior and posterior borders not; the plate behind the opening narrow and beset with one row of long bristles; the anterior plate much broader. The coxae of the gonopods (figs. 175, 176) are loosely united. The base of the telopodite is swollen; the hairs are very long and thin; it passes without band or suture into the terminal part; the latter forms in its middle part a complete spiral; the tip is finely dentate.

Pacaltsdorp, George Div.; Caledon (7532), Cape.

149. *Antiphonus circulus* n. sp.

(Pl. VIII, figs. 180-185.)

Colour dirty yellow. Width of metasomites 5 mm., prosomite 3.7 mm.

Anterior part of the clypeus densely, the rest of the clypeus sparsely covered with hairs. Vertex nearly hairless. Collum nearly as wide as the second segment, the sides with the same thick callosity as in the following segments; passing gradually into the fine border of the anterior and posterior margin, the anterior border extending further upwards than the posterior. Dorsum strongly arched, the keels rising at the middle of the sides (fig. 185); the posterior end of the keel, from the fifth segment, like a short tooth scarcely passing the posterior margin; on segments 16, 17, 18 the tooth is larger. The pore is located in the middle of the lateral callosity, directed

obliquely upwards and outwards (fig. 185). The dorsal surface of the metasomites and the sides beneath the keel slightly wrinkled like leather; prosomites smooth; transverse suture sharp, smooth. The nineteenth segment very short. Caudal process short, tapering, straight, transversely truncate, beset with long bristles resting on little tubercles. Anal scale arched, with two low, rounded tubercles. Valves with raised margin and two long bristles based on little tubercles beside the margin. Sternite five densely bristly but without process. Sternite six with two thick transverse plates, beset with long bristles, separated by a deep notch (fig. 185). The posterior sternite broad, with three rows of long bristles, but without transverse ridges or processes. The male genital process on the second coxa bluntly conical, reaching beyond the distal margin of the coxa (fig. 186). The anterior male legs have traces of a rudimentary claw pad; the claw well developed (fig. 180). Gonopods (figs. 182, 183): the ventral surface of the sixth and seventh segments is not modified for the reception of the long gonopods. The coxae are united by a membrane; the base of the telopodite is swollen; the hairs are very long and thin. The telopodite describes a complete circle, in the middle of the circle a little lamellar enlargement.

Port St. Johns (13489), Cape.

150. *Antiphonus diploconus* Attems.

1901. Attems, Neue Polyd. Hamb. Mus., Mitt. Nat. Hist. Mus., xviii, p. 101, pl. iii, figs. 34, 35.

The lateral margin of keels 7-19 is narrowly bordered; only the neighbourhood of the pore, located at the side of the posterior end, is swollen; this little callosity is completely rounded posteriorly. The pore is directed outwards. In *A. circulus* the callosity is as long as the whole metasomite, the pore opens in the middle and is turned obliquely upwards. The posterior end of the keel is sharp.

Port Elizabeth, Cape (Dr. H. Brauns).

Gen. *AULODESMUS* Cook.

1895. *Aulodesmus* Cook, East Afr. Pol., Proc. U.S. Nat. Mus., xviii, p. 83.

1899. *Aulodesmus* Cook, The Fam. Gomph., *ibid.*, xxi, p. 713.

1898. *Omodesmus* Cook, Brandtia, xvi.

1899. *Omodesmus* Cook, Proc. U.S. Nat. Mus., xxi, p. 700.

1898. *Tymbodesmus* Cook, Brandtia, xvi.

1899. *Tymbodesmus* Cook, Proc. U.S. Nat. Mus., xxi, p. 707.

The differences between *Aulodesmus*, *Omodesmus*, and *Tymbodesmus* are so insignificant that I prefer to take the latter as synonyms of *Aulodesmus*. Cook published in 1899 a long diagnosis of this genus. The principal characters are the following :—

Four olfactory cones. Sternite 15 with a conical process between the anterior legs. Sternite 16 without a process. Sternite 6 with a process between the anterior legs. Posterior sternites with a transverse, medially interrupted ridge between the bases of each pair of legs. Anterior legs of the male with an apical claw pad, wanting sometimes on the sixth pair. Pores on segments 5, 7, 9–19.

Telopodite of the gonopods very long and strongly curved; in the distal part after the first curvature it is enlarged and beset with strong spines.

Key to the Species of *Aulodesmus*.

- 1a. The gonopodial telopodite bears a sack-shaped prominence in the second curvature near the tip *flavosignatus*.
- 1b. Gonopodial telopodite without this lobe 2.
- 2a. The lateral keels nearly horizontal, not following the slope of the dorsum . . . 3.
- 3a. The enlargement of the gonopodial telopodite after the first curvature has one long, pointed cone in the proximal corner of the side turned to the base of the telopodite. The distal process of the enlarged plate is thick and blunt. The lateral spine is nearly as large as the median spine of the outer side (fig. 210) *oxygonus* Pet.
- 3b. The enlargement of the gonopodial telopodite has two little cones in the proximal corner, the distal process is divided at several points. The lateral external spine is much smaller than the median spine (fig. 206) *peringueyi* n. sp.
- 2b. The lateral keels follow the slope of the dorsum, their surface declivous . . . 4.
- 4a. Collum wider than the second segment *laticollis* n. sp.
- 4b. Collum as wide as or less than the second segment 5.
- 5a. The gonopodial telopodite describes one complete circle in the distal part. Sixth pair of legs in ♂ without claw pads *mossambicus* Pet.
- 5b. The gonopodial telopodite is S-shaped, not forming a complete circle. Sixth pair of legs in ♂ with claw pads 6.
- 6a. Sternal process of fifteenth segment with a furrow; dorsum strongly declivous. Width 9.8 mm. The pores directed obliquely upwards . . . *figlinus* Cook.
- 6b. Sternal process of fifteenth segment not furrowed. The keels a little raised. Width 7 mm. The pores directed outwards, the lateral margin of the keel notched by the pore cavity *falcatus* Karsch.

151. *Aulodesmus laticollis* n. sp.

(Pl. IX, figs. 211-215.)

Colour dirty yellow and brown. Width: metasomite 11.6 mm., prosomite 7.5 mm.

Clypeus with one anterior row of bristles. A small strip of the labrum is bristly. Vertex hairless. Collum broader than the second segment; its sides narrowed, with a broad, well-defined callosity and passing into the fine border of the anterior and posterior margins. The keels rise strongly at the sides and continue the moderate slope of the dorsum. The lateral callosity is broad; from the middle of the body the posterior end is pointed, reaching beyond the posterior margin. The keel of the nineteenth segment is a short but distinct little tooth overlapped by the keel of the eighteenth segment. The pores open in the middle of the callosity, directed obliquely upwards. The bristles of the tapering, transversely truncate caudal process do not rest on tubercles. The tubercles of the anal scale are surpassed by the middle point. Margin of the valve raised; two bristles beside the margin. Sternite 5 without a process. Sternite 6 with a long, lamellar, rounded, strongly bristly process between the anterior legs. Sternite 15 with a triangular process, directed obliquely in a narrow groove of the fourteenth segment. Sternite 16 without a process; the posterior sternites with transverse ridges, the eighth and ninth only between the posterior legs, the tenth between the posterior, and a very short one between the anterior legs. From the eleventh sternite there are two ridges, one between the anterior and one between the posterior legs, both interrupted in the middle; behind the posterior ridge there are bristles. No pleural keel.

The second to sixth pairs of male legs have a large pad under the broad, blunt claw. The upper side of the tarsal joint is beset with strong, blunt papillae. The tubercles on the ventral surface of tibia and tarsus are more numerous than in *A. peringueyi*, and are also present on the postfemur (fig. 213); the praefemur projects in a rounded protuberance on the dorsal side (fig. 215). The gonopodial opening is regularly transversely oval, its posterior margin a little raised. Gonopods (figs. 211, 212, 214): the telopodite is enlarged distally from the first curvature and bears several processes on this enlargement: on the median and lateral side one long, pointed spine; on the side turned to the basal trunk proximally a pointed, and distally a rounded, process; the latter with a little tooth. The distal part

of the telopodite describes a complete spiral and is terminated by a little dentate plate near the slender process with the seminal duct (fig. 214).

Umtali, S. Rhodesia (13736).

152. *Aulodesmus oxygonus* Pet.

1862. *Eurydesmus oxygonus* Peters, Ergebn. Reise Mozambique, p. 535, pl. xxxiv, fig. 7.

1895. *Aulodesmus oxygonus* Cook, Proc. U.S. Nat. Mus., xviii, p. 89.

1899. *Eurydesmus oxygonus* Attens, Syst. Pol., Denkschr. Ak. Wiss. Wien, lxxviii, p. 272.

1899. *Aulodesmus oxygonus* Cook, Proc. U.S. Nat. Mus., xxi, p. 701.

(Pl. IX, fig. 210.)

This species, originally recorded from Rios de Sena near the Zambesi, is represented by a male from Salisbury, Rhodesia (B. 800). I described it from Zanzibar. The drawings published by Cook do not show clearly enough the parts of the gonopods distinguishing this species from the allied species, and I therefore give a drawing of the same.

153. *Aulodesmus peringueyi* n. sp.

(Pl. IX, figs. 204-209.)

Colour relatively dark earthy-brown, the keels lighter. Width of metasomites 8 mm., prosomites 5 mm.

Labrum with two rows of strong bristles. Clypeus with a little group of bristles on each side, the rest without bristles. Collum as wide as the second segment, the sides slightly narrowed, rounded, callous. The keels rise above the middle of the side and do not follow the slope of the dorsum, but are more or less horizontal. The lateral margin is occupied by a large, well-defined callosity, passing over into the narrow border of the anterior margin. The posterior end is bluntly toothed; this tooth extends to beyond the posterior margin from the fifteenth segment backwards. The keels of the eighteenth segment overlap those of the nineteenth segment a little (fig. 205). The dorsal surface of the metasomites is distinctly wrinkled, that of the prosomites less so. The pleural keel beset with pointed warts visible up to the seventeenth segment. The caudal process tapering and transversely truncate, the bristles resting on little tubercles. The anal scale triangular, the point reaching beyond the lateral thick warts. Anal valves with a thick, raised margin; the anterior bristle beside the

margin, the posterior bristle on the margin. Sternite five without a process. Sternite six with a long, tongue-shaped, bristly process directed straight downwards; on the aboral side this process has a short furrow (fig. 208). Sternite eight with one cone near each posterior leg. Sternites nine and ten with a ridge interrupted in the middle, between the posterior legs. From the eleventh sternite two interrupted ridges. On the fifteenth sternite the anterior ridges are united, forming a median triangular process.

Legs of pairs 2-6 in ♂ with a large claw pad. The claw short and blunt. The tarsus relatively long, the upper side of the praefemur swollen. The coxa and praefemur of the anterior legs densely covered with long hairs; the posterior legs sparsely hairy on these joints; the last joint with strong, pointed bristles on the upper side. Postfemur, tibia and tarsus with rounded protuberances and little spines. On the femur the bristles are based on the tubercles, on the postfemur, tibia and tarsus close beside the tubercles (fig. 209). Gonopodial opening ovate, the lateral and posterior margin moderately raised. Gonopods (figs. 204, 206, 207): the enlarged plate distally to the first curvature bears on its outer side one long and one short spine (*s.t.*). On the side turned to the base a proximal lamella with two points (*l*)—(*A. oxygonus* has one strong cone) and a 3-pointed branch (fig. 206). The tip is bifid, one branch bearing the seminal duct (fig. 204).

Umtali (13727-13729), S. Rhodesia.

154. *Aulodesmus mossambicus* (Peters).

1862. *Eurydesmus mossambicus* Peters, Nat. Reise Mozambique, v, 533.

1881. *Eurydesmus mossambicus* Karsch, Arch. f. Naturg., Bd. 47, pl. iii, fig. 26.

1899. *Eurydesmus mossambicus* Attems, Syst. d. Polydesm., ii, p. 273.

1895. *Aulodesmus mossambicus* Cook, Proc. U.S. Nat. Mus., xviii, p. 88.

1909. *Aulodesmus mossambicus* Cook, Proc. U.S. Nat. Mus., xxi, p. 715.

Mozambique: Cabaceira, Querimba, Tette (Pet.). Quilimane, near Paguruni (Stuhlmann).

Gen. *ULODESMUS* Cook.

1898. Cook, Brandtia, xvi.

1899. Cook, Proc. U.S. Nat. Mus., xxi, p. 689.

Four olfactory cones. Sternite 6 with one or two processes

between the anterior legs. Sternite 15 and 16 without processes. The posterior sternites without distinct transverse ridges. Legs of pairs 2-6 or 7 in male with apical pad. Praefemur expanded dorsally. Pores on segments 5, 7, 9-19. Keels well developed, the sides callous. The gonopodial telopodite is not enlarged after the first curvature, but bears only one or two strong spines. The tip is deeply biramous; one branch with the seminal duct may be considered as a tibial process, the second as tarsus. The telopodite describes more than a circle.

Key to the Species of Ulodesmus.

- 1a. Sternite 6 with two rounded processes. (Tibial process of the gonopod much longer than the tarsal lobe) *micramma* Cook.
- 1b. Sternite 6 with one process. (Tibial process of the gonopods a little longer, of equal length with the tarsal lobe, or shorter) 2.
- 2a. Sternite 8 with two hairy cones, one next to each anterior coxa. The nineteenth segment is overlapped by the keels of the eighteenth segment. Collum appreciably broader than the second segment. (Margination of anal valves thick. The gonopodial tarsus far surpasses the short tibial process.) Width 7.5 mm. *biconus* n. sp.
- 2b. Sternite 8 without processes. The keels of the eighteenth segment do not overlap the nineteenth segment. Collum as wide as the second segment 3.
- 3a. Margination of anal valves very narrow. Process of sternite 6 with straight terminal margin. The gonopodial tarsus long and slender, as long as the tibial process. Width 3.4 mm. *bispinosus* n. sp.
- 3b. Margination of anal valves thick. Process of sternite 6 notched. The gonopodial tarsus short and broad, hatchet-shaped, surpassed by the tibial process. Width 5.5 mm. *securifer* n. sp.

155. *Ulodesmus micramma* Cook.

1899. Cook, Proc. U.S. Nat. Mus., xxi, p. 690, pl. lvi, fig. 1.

(Pl. VIII, figs. 190-194.)

Colour dirty yellowish-brown. Width 3-3.7 mm.

Collum nearly as wide as the second segment, the sides broadly rounded and callous, the callosity of the collum and segments 2-4 smaller than on the following segments. Antennae slender, not incrassate at the tip. Labrum densely bristled. The anterior margin of the clypeus with one row of bristles, the rest of the head hairless. The keels rise steeply at the sides and their surface continues nearly the slope of the dorsum. The side of the keel convex, occupied by a large callosity; the pore opens in the middle of this callosity directed obliquely upwards and outwards. The posterior end of the callosity is blunt; as it is also on the last segments (fig. 193). The keels of

the eighteenth segment overlap the anterior margin of the nineteenth segment, but not its posterior margin. Surface of the metasomites dorsally very slightly wrinkled, the keels a little more wrinkled. Transverse suture sharply defined. No pleural keel. Anal process tapering, truncate; anal valves with moderately raised and narrow margination; near the margin two bristle-bearing warts. Anal scale triangular, with two little warts.

Sternite five without a process. Sternite six with two rounded hairy lamellae separated by a deep notch between the anterior legs (fig. 192); the posterior sternites without transverse ridges and without processes; with a row of strong bristles along the posterior margin and some scattered bristles over the surface. The praefemur of the male legs is swollen and prominent on the dorsal side. Second to seventh pairs of legs with an apical pad, this pad rounded, not dentiform (fig. 194). Coxa of sixth pair with a little hairy lobe on the inside. Gonopods (figs. 190, 191): the telopodite describes more than a complete circle; no nodiform enlargement distally from the first curve. In the middle of the circle laterally one strong tooth. The tibial process (*Tf*) is long, far surpassing the little tarsal lobe (*Ta*). The tibial process is enlarged at the middle, with a little tooth. The tarsus is finely dentate at the tip.

Krantzkop (B. 3391), Natal. Natal, Durban, Maritzburg (Cook).

156. *Ulodesmus biconus* n. sp.

(Pl. IX, figs. 198-203.)

Colour light yellowish-brown. Width: metasomite 7.5 mm., pro-somite 5.8 mm.

Labrum with several rows of bristles. Clypeus with one anterior row of bristles, the rest of it hairless. Collum appreciably broader than the second segment. The lateral callosity of the collum and segments 2-4 narrow. Dorsum strongly arched; the keels rise in the middle of the sides and continue the slope of the dorsum (fig. 202). The dorsal surface of the pro- and meta-somites finely wrinkled like leather, the metasomites somewhat more so than the keels. The lateral callosity, smooth and shining, occupies about the posterior two-thirds of the sides, passing anteriorly into the narrow margination. Posterior end of the callosity somewhat pointed. The pore is situated in the middle of the callosity and turned upwards. The nineteenth segment is very small and its lateral teeth are surpassed by the keels of the eighteenth segment.

Sternite six with a lamellate, truncate, nearly straight, downwardly directed process between the anterior legs. Sternite eight with a hairy cone beside the coxa of the anterior legs. The remaining sternites without processes and without transverse ridges; broad, weakly hollowed out in the middle, the whole surface hairy. Caudal process tapering, the bristles not arising from tubercles. Anal scale triangular; the lateral bristle-bearing warts small, far exceeded by the median point. Margination of the anal valves of medium size; the posterior bristle-wart on, the anterior wart beside, the margin. Legs all abundantly bristled, especially the ventral side of praefemur and coxa and the dorsal side of tarsus. The praefemur projecting on the dorsal side (fig. 203). Legs of pairs 2-6 with a large cushion under the pointed claw (fig. 201). The bristles of the dorsum arise from little knobs. The gonopodial opening transversely ovate, the lateral parts a little raised. Gonopods (figs. 198, 199, 200): the telopodite describes two spirals; in the middle of the first there are two teeth, one lateral and one median. The tip is biramose, the branches crossing; one branch bearing the seminal duct, the other a hooked (tarsal) lobe.

Inchanga (B. 3379), Natal. ♂.

157. *Ulodesmus bispinosus* n. sp.

(Pl. VIII, figs. 186-189.)

Colour dirty yellow-brown. Width: metasomite 3.4, prosomite 2.6 mm.

Dorsum strongly arched, the keels continuing the slope (fig. 188); they rise beneath the middle of the sides. The lateral margin straight. The lateral callosity occupies the posterior two-thirds of the whole length; its posterior angle is rounded, even in the last segments. The pore opens on this callosity, directed obliquely upwards and outwards. Dorsal surface of the metasomites nearly smooth, very finely wrinkled, like leather; the surface of the keels more roughly wrinkled. Eighteenth segment very short, its keels not overlapping the nineteenth segment. Labrum densely bristled: clypeus with one row of fine hairs; the rest of the head hairless. Collum as wide as the second segment, the sides elliptical, callous, the anterior and posterior borders with narrow margination. The caudal process tapering, truncate, the bristles set on very small tubercles. The margination of the anal valves very fine and low; the anal scale triangular, the warts of medium size.

Sternite six with one lamellar, narrowed, densely hairy process with

smooth (not notched) terminal margin; the process is directed obliquely forwards. The fifth and sixteenth sternites without processes and all the sternites without transverse ridges or grooves; the posterior margin bristly. Praefemur projecting on the dorsal side. The anterior legs with well-developed claw and a little pad (fig. 189). Gonopods (figs. 186, 187): the telopodite is long and slender and describes two spiral curves. In the first circle two strong, straight teeth. The tip is biramose, both branches being of the same length. The tibial process has a lateral tooth in the middle, the tarsus is long and slender and finely dentate at the apex. The hairs of the femoral part are very long and fine.

Pietermaritzburg (B. 3378), Natal. ♂.

158. *Ulodesmus securifer* n. sp.

(Pl. VIII, figs. 195-197.)

Colour dirty yellow-brown. Width 5.5 mm.

Labrum densely bristly. Clypeus with one row of hairs, the rest hairless and very smooth. The sides of the collum elliptical, rounded, a little callous, as wide as the second segment. The keels rise below the middle of the sides and are a little raised, not following completely the slope of the dorsum. The lateral callosity occupies the posterior two-thirds and passes anteriorly into the fine margination. The pores are located in the middle of the callosity, directed obliquely upwards. The posterior end is at right angles to the middle of the body, then forming a blunt angle. The keels of the eighteenth segment do not overlap the nineteenth. The dorsal surface of the metasomite nearly smooth, the wrinkles very slight, like leather.

Sternite 6 with a large, tapering, hairy process, notched in the middle line, lying between the anterior legs (fig. 195). Sternites 5, 8, and 16 without processes. Posterior sternites with a shallow transverse impression, hairy. The margination of the anal valves broad, and moderately high. The anal scale triangular, the bristlewarts small. Gonopods (figs. 196, 197): the hairs of the femur very long. The distal part of the telopodite makes more than one complete circle. In the middle of the first circle two teeth, one large one on the median and a small one on the lateral side. The tip is triramose, the longest branch the tibial process bearing the seminal duct; it bears a little finely striated and dentate lobe. The strong hatchet-like lobe is probably the tarsus.

Port Shepstone (2422), Natal. ♂.

Gen. NEODESMUS Cook.

1898. Cook, Brandtia, xvi.

1899. Cook, Proc. U.S. Nat. Mus., xxi, p. 694.

The gonopods of this genus are distinguished by a spoon-shaped excavation on the distal part.

159. *Neodesmus cafferarius* (Porat).

1872. *Eurydesmus cafferarius* Porat, Öfvers. Vet. Ak. Förh., Nr. 5, p. 13.

1899. *Eurydesmus cafferarius* Attems, Syst. d. Polydesm., ii, p. 270.

1895. *Sphenodesmus cafferarius* Cook, Proc. U.S. Nat. Mus., xviii, p. 93.

1899. *Neodesmus cafferarius* Cook, Proc. U.S. Nat. Mus., xxi, p. 696. Caffraria.

160. *Neodesmus juvenis* Cook.

1899. Cook, Proc. U.S. Nat. Mus., xxi, p. 695.

1862. *Eurydesmus mossambicus* juv. Peters, Reise Mossamb., v, p. 533.

Mozambique : Cabaceira, Rios de Sena, Querimba, Tette.

Fam. VANHOEFFENIIDAE Att.

1914. Attems, Indo-Austral. Myr., p. 158.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 139.

Gen. VANHOEFFENIA Att.

1907. Attems, Deutsche Südpolar Exp., p. 426.

1914. Attems, Indo-Austral. Myr., p. 168.

161. *Vanhoeffenia nodulosa* Att.

1907. Attems, Deutsche Südpolar Exp., p. 427.

Simonstown, Cape.

ORDER JULIFORMIA.

1872. *Julides*, Saussure et Humbert, Miss. Scientif. Mexique, p. 61.

1881. *Juliden*, Karsch, Zeitschr. Ges. Naturw., (3), vi, p. 1.

1884. Fam. *Julidae* Latzel, Myr. öst. Ung. Mon., ii, p. 238.

1887. Fam. *Julidae* Pocock, Ann. Mag. Nat. Hist., (5), xx, p. 294.
 1893. Fam. *Julidae* Bollmann, Bull. U.S. Nat. Mus., No. 46, p. 155.
 1895. Order *Diplochaeta* ex parte Cook, Ann. N. York Ac. Sci., ix, p. 6.
 1896. Suborder *Juloidea* Silvestri, I Diplopodi, p. 49.
 1898. Suborder *Juloidea* Attems, Syst. d. Polydesm., i, p. 228.
 1900. Suborder *Opisthospermophora* Verhoeff, Beitr. z. K. Pal. Myr., x., Zool. Jahrb., xiii, p. 54.
 1910. Suborder *Opisthospermophora* Verhoeff, Nova Acta, xcii, p. 211.
 1910. Order *Opisthospermophora* Verhoeff, Diplop. Deutschl., p. 27.
 1913. Order *Opisthospermophora* Verhoeff, Zool. Anz., xliii, p. 56.
 1914. Super-order *Julidea* Attems, Indo-Austral. Myr., p. 286.
 1926. Order *Juliformia* Attems, Kükenthal's Handb. d. Zool., iv, p. 108.

No spinning glands and thus no spinning styles. Gnathochilarium with undivided or longitudinally divided praebasilare. Promentum separated or mentum undivided. The sternites of the abdomen are coalesced with the tergites in the great majority of species (only in some *Julidae* sens. strict. are they free). The anterior sternite of each somite is larger and participates in the formation of the inserted cylinder. The sternites are sliding plates ("Gleitplatten-sternite," Verhoeff). If the sternites are not coalesced with the tergites they coalesce with one another. Tracheal trunks not forked, most of the tracheae rising from the end of the trunk. Pores in an interrupted row from the fifth or sixth segment. No coxal pouches. The cheeks (pleurites of the head) 2-jointed, the anterior joint often with a lobe in the ♂. The roughened plate ("Reibplatte," Verhoeff) of the mandible without file ("Reibfeile," Verhoeff). Ridges ("Reibleisten," Verhoeff) and saw ("Reibplattensäge," Verhoeff) sometimes present. Median area of the epipharynx without longitudinal thickening and without teeth and warts. Collum without condyle. Penis behind the second pair of legs.

The gonopods are sunk in a membranous pouch and can be protruded together with this pouch; the sternites, if present, free (not coalescent with the tergite). The ventral pieces of the tergite are free or are coalesced more or less behind the sinus of the gonopods; the sinus of the gonopods is never closed in front. The first pair of appendages of the seventh somite of the ♂ modified as gonopods. The second pair also modified or sometimes wanting altogether, never an unmodified pair of legs. More than 40 segments; the number varies within a single species.

Verhoeff has instituted (1900) the name *Opisthospermophora* for the *Julidae*, and perhaps also the *Spirobolidae* and *Spirostreptidae*, with the following diagnosis: "Immer mit vorderen und hinteren Gonopoden, die vorderen stets ohne Spermacanal, ein solcher aber immer in mehr oder weniger starker Entwicklung in den hinteren Gonopoden, etc. . . ." Nothing of all this is true for the group as understood to-day. In later papers Verhoeff changed the diagnosis of his "*Opisthospermophora*," but he tries to maintain the opisthospermy in one of the last papers on this subject. I am curious to know how Verhoeff will prove the opisthospermous classification of forms possessing no posterior gonopods at all.

Synopsis of the Suborders of Juliformia.

- 1a. The stipites gnathochilarii touch one another in their basal part, thus separating the mentum and promentum *Juloidae*.
- 1b. The stipites are widely separated by the mentum or promentum. Promentum if present always in contact with the mentum 2.
- 2a. The mentum is not divided (duplomentum, Verhoeff) and separates the stipites and the praebasilare widely. No cardines. Last joint of legs of the ♂ generally padded, the fourth and fifth joints never padded . . . *Spiroboloidea*.
- 2b. The mentum entire (duplomentum) or divided (mentum + promentum), surrounded at the sides by the stipites, which are in contact with the prae-basilare. Cardines present. The last joint of the legs never padded, the fourth and fifth joints often padded *Spirostreptomorpha*: 3.
- 3a. The promentum or the anterior part of the undivided mentum separates the lamellae linguales. First pair of male legs modified
2. Subsuborder *Cambaloideae*.
- 3b. The lamellae linguales are contiguous along the greater part of their medial margins; the anterior angle of the undivided mentum only enters a little way between the bases of the lamellae linguales. First pair of male legs not modified 1. Subsuborder *Spirostreptoideae*.

SUBORDER JULOIDEA Meinert.

1868. *Julidae* Meinert, Naturh. Tidsskr., (3), v, p. 6.
1894. *Julidae* Pocock, J. Linn. Soc., xxiv, p. 480.
1896. *Julidae* Silvestri, I Diplop., p. 59.
1896. *Zygochaeta* Cook, Brandtia, ii, p. 8.
1903. *Juloidae* Pocock, Biol. Centr. Amer., p. 53.
1904. *Zygochaeta* Cook, Alaska, pp. 51, 69.
1903. *Zygochaeta* Silvestri, Diplop. Anat., p. 23.
1910. *Symphygognatha* Verhoeff, Nova Acta, xcii, p. 211.
1910. *Symphygognatha* Verhoeff, Diplop. Deutschl., p. 28.
1914. *Juloidae* Attems, Indo-Austral. Myr., p. 286.
1926. *Juloidae* Attems, Kükenthal's Handb. d. Zool., iv, p. 182.

The gnathochilarium is distinguished from the gnathochilarium of all the rest of the Juliformia by the fact that the stipites meet at their basal parts; separating the mentum and promentum. Between the junction of the stipites and the hypostoma two bridge-plates are present. Contiguous with the hypostoma is the praebasilare and in front of this the mentum. Both pairs of legs of the seventh somite are modified into gonopods. The first or anterior gonopod is generally simple and protects the second or posterior gonopod; rarely one rudimentary second joint is present in the anterior gonopod. The posterior gonopod is more complicated; the prostate gland opens in its base. The posterior gonopod has often a large coxal process, the mesomerite, or it is simple and the mesomerite is not distinguishable. The penultimate and antepenultimate joints of the male legs are often padded; the last joint never. Apophyses may be present on certain joints of the legs. First pair of legs of the ♂ nearly always transformed into a pair of little hooks or knobs. Transverse suture distinct. Metasomites generally longitudinally striated, as is also the dorsum.

Verhoeff has tried to put a new interpretation on the parts of the gnathochilarium; he thinks that the stipites in their posterior half and junction (not coalescence) are not stipites, but mento-stipites, *i.e.* that the mentum is divided into two halves and each half is fused with one stipite. The plate behind the "mento-stipites," between these and the hypostoma, hitherto interpreted as mentum, would in that case have to receive a new name. Verhoeff believes that this plate is a new mouth-part found only in the Juloidea and wanting in the remaining orders, and he calls it intermentum. I cannot agree with this interpretation, as it makes, so it seems to me, the difficulties not less but greater.

Fam. JULIDAE Verhoeff.

- 1911. Verhoeff, Über. Diplop., 49, Zool. Anz., xxxviii, p. 536.
- 1914. Attems, Indo-Austral. Myr., p. 287.
- 1896. *Deuteroiulinae* Verhoeff, Diplop. Rheinpreuss., p. 210.
- 1899. *Deuteroiulinae* Verhoeff, Beitr. z. K. Pal. Myr., ix, Arch. Naturg., p. 214.
- 1909. *Deuteroiulinae* Verhoeff, Zool. Anz., xxxiv, p. 475.
- 1909. *Deuteroiulinae* Attems, Myr. Vega Exped. Ark. Zool., v, p. 34.
- 1910. *Deuteroiulinae* Verhoeff, Nova Acta, xlii, p. 180.
- 1926. *Julidae* Attems, Kükenthal's Handb. d. Zool., iv, p. 186.

The *Julidae* are divided into six tribes; only one of them, the *Archiulini*, is represented in South Africa by one imported species.

Key to the Tribes of Julidae.

- 1a. Anterior gonopod with flagellum 1. *Julini*. 2. *Brachyiulini*.
- 1b. Anterior gonopod without flagellum 2.
- 2a. Posterior gonopod without any coxal process 3. *Pteridoiulini*.
- 2b. Posterior gonopod with a coxal process 3.
- 3a. The posterior gonopod with short coxa and a very large and thick coxal process, much larger than the small telopodite 4. *Paectophyllini*.
- 3b. The coxal process of the posterior gonopod not larger than the telopodite, times small 4.
- 4a. The coxal process of the posterior gonopod partially coalescent with the telopodite, its free part short, not lying close to the anterior gonopod. A paracoxite always wanting 5. *Pachyiulini*.
- 4b. The coxal process of the posterior gonopod large, completely separated from the telopodite and lying close to the anterior gonopod; a paracoxite generally present 6. *Archiulini*.

Tribe ARCHIULINI.

1909. *Schizophyllini* Verhoeff, Zool. Anz., xxxiv, p. 477.

1910. *Schizophyllini* Verhoeff, Über Diplop., 12, Nova Acta, xlii, p. 182.

Key to the Genera of Archiulini.

- 1a. Ocelli flat, indistinctly bounded. Prosomites smooth, not sulcate. Fovea of posterior gonopods wanting or indicated by a little groove. Small pale-coloured species *Leptophyllum* Verhoeff.
- 1b. Ocelli convex, with clear boundaries. Prosomites with one transverse furrow or with little oblique or anastomosing striae; fovea of the posterior gonopods distinct. Medium to large dark-coloured forms 2.
- 2a. Free part of the prosomite with at least one transverse furrow. Penis bifid, without median lobe between the points. Fovea shallow. Anal segment and a number of segments in front of it densely hairy
Tachypodiulus Verhoeff.
- 2b. Prosomites with oblique, irregular striae. Penis with median rounded lobe between the two points. Fovea large, bottle-shaped. Only the anal segment hairy *Archiulus* Berl.

Gen. ARCHIULUS Berl.

1886. *Archiulus* Berl., Julidi del Museo di Firenze, pp. 28, 44.

1894. *Palaeoiulus* Verhoeff, Beitr. Anat. Syst. Julid., Verh. Zool. Bot. Ges., xlv, p. 150.

1895. *Schizophyllum* Verhoeff, Aphorismen, etc., Zool. Anz., p. 478.

1910. *Schizophyllum* Verhoeff, Über Diplop., 12, Nova Acta, xlii, p. 185.

1927. *Archiulus* Attems, Abh. Senckenb. Ges., xxxix, p. 274.

This genus was divided by Verhoeff into five subgenera; a key to these was given by the author in the last-mentioned paper, p. 194.

In South Africa is found *A. morleti*, a species belonging to the subgenus *Hemipodiulus* characterised as follows:—

Subgen. HEMIPODIULUS Verhoeff.

1892. *Julus* subgen. *Hemipodiulus* Verhoeff, Neue Diplop. Pal. Reg., Zool. Anz., Nr. 403, p. 4.

1894. *Palaeoiulus* subgen. *Mesoiulus* Verhoeff, Beitr. Anat. Syst. Jul., Verh. Zool. Bot. Ges., xlv, p. 153.

1910. *Schizophyllum* subgen. *Hemipodiulus* Verhoeff, Nova Acta, xlii, pp. 187, 195.

Horn-arm of the posterior gonopod tribrachiate; process of the channel-arm shorter than the arm. Mesomerite long, slender, narrowed in the middle, then enlarged and terminated by a long horn. The seminal duct ends at the tip of a long slender process.

Key to the Species of *Hemipodiulus* Verhoeff.

- 1a. Anterior gonopod with two teeth at the end. The lateral lobe of the solaenomerite gradually tapering, and the tip, beset with little spines, is close to the opening of the seminal duct 2.
- 2a. The lateral tooth on the tip of the anterior gonopod very small, scarcely visible. Mesomerite with four teeth (the main branch with three teeth). The paracoxite with two or three lateral teeth proximal from the three-toothed tip. The internal ridge of the anterior gonopod much shorter than the telopodite *lienharti* Bröl. (= *involutum* Verh.).
- 2b. The lateral tooth of the anterior gonopod well developed. Mesomerite with three teeth (the main branch bipartite). The paracoxite with one lateral tooth 3.
- 3a. The medial tooth on the tip of the anterior gonopod curved like a horn, the internal ridge nearly as long as the telopodite *fissus* Verh.
- 3b. The medial tooth of the anterior gonopod longer and directed straight out distally. The internal ridge much shorter than the telopodite *bipartitus* Verh.
- 1b. The tip of the anterior gonopod broadly rounded; on the aboral surface one little horn or two weak knobs. The lateral lobe of the solaenomerite broad, its tip distant from the tip of the channel-arm 4.
- 4a. On the aboral side of the anterior gonopod one slender horn, or, seen in profile, a hook; horn-arm of the posterior gonopod with three branches equally divergent *moreleti* Luc.
- 4b. On the aboral side of the anterior gonopod two weak knobs. One of the branches of the horn-arm is directed downwards and is distant from the two distal branches opposite one another *cervinus* Verhoeff.

162. *Archiulus (Hemipodiulus) moreleti* Luc.

1860. *Julus moreleti* Lucas, Arthur Morelet, Not. s. L'hist. Nat. des Azores, p. 96.
 1870. *Julus moreleti* Porat, N. Myr. fr. Azorerna, Öfvers. Vet. Ak. Förh., xvii, p. 820, pl. ii, figs. 9, 10.
 1892. *Julus (Hemipodiulus) karschi* Verhoeff, Zool. Anz., Nr. 403, p. 380.
 1883. *Julus moreleti* Porat, Myr. Kamerun, Bih. Sv. Ak. Handl., xx, p. 56.
 1894. *Palaeoiulus (Mesoiiulus) karschi* Verhoeff, Beitr. Anat. Syst. Jul., Verh. Zool. Bot. Ges., xlv, p. 157, pl. vi, figs. 16-21.
 1895. *Julus karschi* Latzel, Beitr. z. K. Myr. Fauna v. Madeira, p. 6.
 1896. *Schizophyllum (Hemipodiulus) moreleti* Brölemann, Boll. Soc. Zool. France, p. 200.

(Pl. XVIII, figs. 427-432.)

Colour black. The legs are said to be rose-coloured or violet-blue (in specimens that have been a long time in alcohol this colour is not distinct). Width of ♂ 2·3-3·3; ♀ 3·8-4·2. Number of somites of ♂ 47 (according to my observation); 45-51 (authors).

Head-plate smooth, very shiny. Five or more supralabral pits. No bristles on the vertex. The cheeks of the ♂ with broad, rounded lobes. Prosomites covered with fine, irregular, oblique or anastomosing striae. Metasomites strongly striated; between the complete striae there are sometimes abbreviated striae, beginning on the suture as well as on the posterior margin. The pore opens somewhat behind the line of the suture, which is bent forwards in front of the pore. The whole trunk hairless. Tail long, slender, the point a little bent upwards, beset with hairs. Anal valves with raised margins. In the ♂ the marginal thickening is furrowed, in the ♀ it is rounded and smooth; next to the marginal thickening a distinct groove. The margin and the median part of the valves beset with dense, short hairs. Anal scale pointed, the point not visibly projecting. Sternite smooth. Fourth and fifth joints of the legs padded from the second pair to the last. First pair of legs of the ♂ consisting of broad, large coxae and 4-jointed telopodites forming a little hook. The suture between the terminal (fourth) joint and the preceding (third) joint indistinct (fig. 432).

Gonopods (figs. 427-431): the anterior gonopod is broadly rounded on the aboral side; near the margin one little horn (fig. 429 c),

appearing in profile as a pointed hook (fig. 428 *c*); on the basal half one thick, blunt lobe (fig. 429). The posterior gonopods are divided into three large branches: the mesomerite (Verhoeff), the solaenomerite (Verhoeff), and the horn-arm, as I call the "coxite" of Verhoeff, because I interpret the parts differently from him. He says that the mesomerite and the solaenomerite constitute together the telopodite, and the third arm in question the coxite; contrary to which I believe that the mesomerite must be interpreted as coxite and the remaining arms as telopodite. The mesomerite (*M*) is solidly and indivisibly coalescent with the tracheal stalks (fig. 430 *TT*), and the two mesomerites are connected by one broad buckle (*v*). I have not been able to see the articulation in the middle of this buckle indicated by Verhoeff. On the aboral side the mesomerite is connected with the telopodite. In the middle the mesomerite is a little narrowed; then it dilates and divides into one long slender terminal horn (fig. 430 *h*) and a shorter plate with two blunt teeth (*ab*). The telopodite consists of two pieces, the solaenomerite (fig. 431) and the horn-arm (fig. 427 *b*). The solaenomerite has at its base the fovea, well figured by Verhoeff. The seminal duct beginning in the fovea runs along the channel arm ("Rinnenblatt" Verhoeff, fig. 431 *f*). The sides of this arm bear the lateral lobe ("Nebenlappen," fig. 431 *n*). The horn-arm (fig. 427 *b*) has three pointed branches.

The distribution of this species is very remarkable: Portugal, Azores, Madeira, Canaries, Cape Verde, Cameroons, and now South Africa. The present state of our information as regards the African Continent makes it impossible to decide whether the range of this species is continuous from the Palaearctic Region through the Cameroons to South Africa, or if it was imported by ships to some parts (Cameroon, Cape Town) and is missing in the intermediary ones. Perhaps the study of the biology of the species will explain this question. Possibly *A. moreleti* commonly creeps into objects which are often carried by ships from the Palaearctic harbours to Cape Town; the fact that it has hitherto been found only in Cape Town leads us to presume that its presence in South Africa is due to importation by mankind, but our almost absolute ignorance of the fauna of West Africa does not allow us to be too certain. A second fact speaking for importation is the complete identity of the Portuguese and South African specimens. If the species had spread in a natural way from the Mediterranean Region through the whole western part of the African Continent we should expect that the South African specimens would prove to be at least a different race.

The labels of the Museum bottles state "very common in gardens." Cape Town (1663, B. 5313, B. 974, 7659, 7667, 7746).

Note.—This species was also imported by ships into Hamburg, but has not acclimatised itself there.

SUBORDER SPIROBOLOIDEA.

- 1896. Fam. *Spirobolidae* Silvestri, I Diplopodi, p. 56.
- 1903. Group *Spiroboloidea* Pocock, Biol. Centr. Amer., p. 59.
- 1909. Order *Spiroboloidea* Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 25.
- 1910. Order *Spiroboloidea* Attems, Voeltzkow's Reise Ost-Afrika, p. 89.
- 1913. Order *Spiroboloidea* Brölemann, Myr. Austral. Mus., ii, Rec. Austral. Mus., x, p. 105.
- 1913. Order *Spiroboloidea* Brölemann, Bull. Soc. Ent. France, No. 19, p. 476.
- 1914. Order *Spiroboloidea* Brölemann, Ann. Soc. Ent. France, lxxxiii, p. 1.
- 1914. Order *Spiroboloidea* Attems, Indo-Austral. Myr., p. 296.
- 1926. Suborder *Spiroboloidea* Attems, Kükenthal's Handb. d. Zool., iv, p. 192.

Mentum not divided (duplomentum, Verhoeff) very large, separating the lamellae linguales one from another and the stipites from the praebasilare. No cardines. Praebasilare a small narrow piece. Both pairs of appendages of the seventh somite modified as gonopods. The anterior gonopod broadly lamellate and protecting the posterior gonopods in its cavity. The sternite of the posterior gonopod if present is more or less coalescent with the coxae. The coxa of the posterior gonopod contains the opening of the prostate gland, whose canal opens either at the top of the gonopods or on the tibial process. The gonopod is thin, flagellate (in these forms the transmission of the spermatozoa is probably performed by the anterior gonopod) or broad, boot-shaped when it is the conductor of the spermatozoa. Last joint of the legs of the ♂ generally padded (other joints never padded). The coxae of some legs often with apophyses. Collum equal in both sexes. First pair of legs of the ♂ normal, resembling the second. Transverse suture sometimes disappearing. Sometimes more than four sense cones on the antennae.

The *Spirobolidea* are still awaiting a systematic revision of genera. In several papers I have tried to group them, dividing the order into

two groups called firstly families, then suborders, viz. the *Spirobolidae* and *Trigoniulidae*.

Brölemann accepts my groups, calling them *phyla*, but he is desirous of proposing some amendments, to which I have the following reply to make. As a primary difference between the two suborders I indicated that in the *Spirobolidea* the posterior gonopods are not connected one with the other, while in the *Trigoniulidea* they are solidly connected by a horseshoe-shaped or angular, strongly chitinated small sternite and by hyaline membranes as well. To this Brölemann (1914, p. 28) replies, "La liaison des gonopodes postérieurs ne paraît pas être réalisée à l'aide d'un sclérite, mais bien d'un ligament dont la suture est à définir." In my opinion it is not a question of a "ligament," the connecting part being a solid, strongly chitinated bar; nothing prevents us from interpreting this bar as a sternite, judging by analogy with similar-shaped parts in other groups of *Julidea*.

As another difference between the two groups I stated that in the *Spirobolidea* the prostate duct opens at the commencement of the seminal duct, which is but little enlarged, while in the *Trigoniulidea* the seminal duct begins with one or two large bladders connected with a strong spine; the prostate duct opens into the first or only bladder. Brölemann says: "Il existe une ampoule séminale aussi bien dans le premier groupe que dans le second," because he found that in several species of *Spirobolidea* the seminal duct at the base of the telopodite is enlarged and bladder-like. I will not contest this fact, but I oppose the view that the bladder at the base of the telopodite as described by Brölemann should be considered homologous with the bladders in the coxae as described by myself. The two structures are totally different both in their anatomical shape and in their morphological value, and the differences between the suborders as I have outlined them remain valid.

A third point in the deductions of Brölemann to which I cannot agree, is the interpretation of that part of the anterior gonopods called by him "brides trachéennes" and interpreted as a part of the tracheal trunk; while I observed that this piece is coalescent with the base of the anterior gonopod in young specimens, and becomes independent later; therefore it cannot be interpreted as being derived from the tracheal trunk.

The genus *Cingalobolus*, described by Carl, is put according to its gonopods in the suborder *Trigoniulidae*, but as regards other characters it is a link between the two suborders. The pores open in the metasomite as in nearly all *Spirobolidea* (one genus is said to have the

pores in the prosomites), and scobinae are present. The scobinae have been considered hitherto as peculiar to the *Rhinocricidae* (of the suborder *Spirobolidea*). Some species of the new genus *Chersastus* also have scobinae.

1. Superfam. SPIROBOLIDEAE Attems.

The posterior gonopods are entirely independent of one another. No trace of a sternite to these gonopods. The prostate duct discharges simply at the beginning of the seminal duct; a special mechanism with large bladders in the coxae is not present. The tracheal stalks lie in the same axis as the gonopods. Anterior gonopods have frequently flexibly attached tracheal stalks. The pores nearly always in the metasomites.

The suborder is not represented in South Africa.

2. Superfam. TRIGONIULIDEAE Attems.

The coxae of the posterior gonopods are united by the sternite and a membrane. The seminal duct begins with a bladder into which the prostate duct discharges from the other side; or there are two bladders connected together, into the first of which the prostate duct discharges, while in the second the seminal duct begins. The tracheal stalks are flexibly attached and in an oblique direction to the axis of the gonopods. The remainder of the tracheal stalks of the anterior gonopods are completely fused with the sternite. Pores (except in *Cingalobolus*) are present in the prosomites.

Brölemann divides the *Trigoniulidea* into three families: the *Trigoniulidae*; the *Pachybolidae* with seven genera, most of which I do not know well; and the *Spiromimidae* for *Spiromimus*, known only through the paper of de Saussure and Zehntner from Madagascar. The description and drawings given in this paper render the morphological interpretation of the parts in question difficult, and I cannot say if the arrangement of these families is correct. We have to deal only with the first family *Trigoniulidae*. It is characterised by the following features.

Two plus two supralabral pits. Labrum with an even or odd number of teeth, *i.e.* in the median line there is a tooth or a sinus. Four sensitive cones on the antennae. Collum laterally attenuated, without any peculiarities. Pores beginning on the sixth segment, opening mostly in the prosomite (only in *Cingalobolus* in the metasomite). The

transverse suture dorsally not visible between the pores, sometimes invisible also ventrally; only in *Cingalobolus* distinct round the whole segment. Horseshoe-shaped impressions (scobina) sometimes present. Sternites transversely striated. Dorsal margin of anal segment more or less angular; forming a little caudal process only in *Cingalobolus*. The coxae of the posterior gonopods are for the largest part membranous and are fused together and with the angular sternites. The borders of the coxae are in part strongly chitinised. The tracheal stalks are inserted flexibly at the external angle of the coxae. Telopodite well separated from the coxae, but without any division, except in *Metiche* and *Mystalides*. I suppose that the internal branch with the ending of the seminal duct is a process of the tibia; the part distal from this process is in consequence the tarsus. Only in *Mystalides* is there a trace of separation between tarsus and tibia, and in *Metiche* the tarsus is well separated.

The typical genus of this family is *Trigoniulus*, of which I said in a former paper that it must be divided. Brölemann, in 1914, began this division, separating a genus *Eucarlia*, to which I agree entirely. I take a step further and distribute the remaining species among three genera: *Trigoniulus* sens. strict., *Spirostrophus*, and *Chersastus* nov. gen. *Spirostrophus* is now characterised in a different manner from before, being thus again revived. The differences between these genera are shown in the following tabular view.

In the material of the Museum the *Spiroboloidea* are represented by only a very small number of species, viz. five in the genus *Chersastus*, as opposed to the *Spirostreptoidea* including more than 70 species. In several bottles are samples of *Chersastus* species other than the five described here, but of these there are only females, and I place no importance upon a description which would be of no systematic value. I would draw the attention of future collectors to these animals.

Key to the Genera of Trigoniulidae.

- 1a. Pores opening in the metasomite. Transverse suture distinct on the dorsum.
Anal segment with a little tail (2) *Cingalobolus* Carl.
- 1b. Pores opening in the prosomite. Transverse suture invisible dorsally; anal
segment dorsally rounded, without tail 2.
- 2a. Metasomites with 2-8 strong teeth. Very large forms. Gonopods as in
Trigoniulus (1) *Acanthiulus* Gerv.
- 2b. Metasomites without teeth; small species 3.
- 3a. The telopodite of the posterior gonopod has a tarsus, laterally inserted and well
defined from the femoro-tibia (3) *Metiche* Attems.
- 3b. A well-defined tarsus not visible in posterior gonopod 4.

- 4a. Coxa and telopodite of the posterior gonopod have the same direction
(4) *Mystalides* Attems.
- 4b. Coxa and telopodite of the posterior gonopod form an angle 5.
- 5a. Internal branch (i.e. the tibial process) of the posterior gonopod covered with fine hairs (5) *Trigoniulus* sens. strict.
- 5b. Tibial process smooth, sometimes wanting 6.
- 6a. Tibial process slender, pointed, and the seminal duct opening as a narrow canal at the tip of this process (6) *Eucarla* Bröl.
- 6b. Tibial process broad, rounded; the seminal duct opening by means of a funnel-shaped aperture between the folds of the process 7.
- 7a. Basal joint (coxa) of anterior gonopod slender, rod-like; coxae of some of the anterior legs with apophyses. No tarsal cushions
(7) *Spirostrophus* S. et Z.
- 7b. Basal joint of anterior gonopod broad, leaf-like; coxae of the anterior legs without apophyses. Tarsal cushions present (8) *Chersastus* nov. gen.

(1) Gen. ACANTHIULUS Gerv.

1841. *Acanthiulus* Gervais, Ann. Sci. Nat., (3), i. p. 70.
1847. *Acanthiulus* Gervais, Ins. Apt., iv, p. 173.
1893. *Acanthiulus* Pocock, Ann. Mag. Nat. Hist., (6), xi, p. 136.
1903. *Acanthiulus* Brölemann, Ann. Soc. Ent. France, lxxii, p. 409.
1903. *Polybunolobus* Pocock, Ann. Mag. Nat. Hist., (7), xii, p. 531.
1910. *Polybunolobus* Attems, Voeltzkow's Reise Ost-Afrika, p. 91.
1913. *Acanthiulus* Brölemann, Myr. Austral. Mus., Rec. Austral. Mus., x, p. 107.
1914. *Acanthiulus* Brölemann, Ann. Soc. Ent. France, lxxxiii, p. 14.
1914. *Acanthiulus* Attems, Zool. Jahrb., xxxvii, p. 383.

The sternite of the anterior gonopods is more or less divided in the middle, each half with a long process. Both joints of anterior gonopods broad and rounded. Posterior gonopods as in *Trigoniulus*, the tibial process covered with fine hairs. Telopodite without a visible division. Anterior legs without apophyses on the coxae. No tarsal cushions. Metasomites with 2-8 strong lateral teeth. Pores in the prosomites. Very large species.

One species with two subspecies from New Guinea and the Aru Archipelago.

(2) Gen. CINGALOBOLUS Carl.

1918. Rev. Suisse Zool., xxvi, p. 448.

Sternite of anterior gonopods V-shaped. Coxites broad and sinuate. Posterior gonopods similar to those of *Metiche* and *Mystalides* in their basal parts. One bladder. The seminal duct opens on a very indistinct broad tibial process without terminal enlargement. No

separate tarsus. Pores in the metasomite. Scobina present. Anal segment with a tail overlapping the anal valves. Transverse suture distinct round the whole segment.

One species from Ceylon.

(3) Gen. METICHE, Attems.

1909. *Metiche* Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 25.

1910. *Metiche* Attems, Voeltzkow's Reise Ost-Afrika, p. 91.

1914. *Metiche* Brölemann, Ann. Soc. Ent. France, lxxxiii, p. 14.

Sternite of anterior gonopods angular, the median angle of medium length, both joints of anterior gonopod broad, rounded, the distal one without deep sinus. The prostate duct of the posterior gonopod opens into the single bladder, from which rises the seminal duct. Telopodite of posterior gonopods with a well-separated tarsus laterally inserted. Anterior legs without apophyses. Tarsal cushions present. Pores in the prosomite.

I have no material to enable me to examine the gonopods again, but I suppose that the telopodite of the posterior gonopod must be interpreted in the sense that the broad terminal part belongs to the tibia and is equivalent to the internal branch or tibial process of *Trigoniulus* and related genera. One species from East Africa.

(4) Gen. MYSTALIDES Attems.

1910. *Mystalides* Attems, Voeltzkow's Reise Ost-Afrika, pp. 91, 94.

1914. *Mystalides* Brölemann, Ann. Soc. Ent. France, lxxxiii, p. 14.

Basal joint of anterior gonopod broad, leaf-like; distal joint without deep sinus. Tibial process of the posterior gonopods long, slender, sometimes overlapping the tip. Coxae and telopodite of posterior gonopods having the same direction, without a strong angle between them as in other genera. Telopodite without distinct division, but the tarsus is sometimes indicated by a small lateral sinus. Pores in the prosomite.

Five species from Madagascar and the Comoro Islands.

Note.—*M. pumilus* has strange sense (?) organs in the distal joint of the anterior gonopods. Besides the usual narrow canals perforating the chitin in the same way as in other parts of the body and well known for a long time, we find considerably wider cylindrical canals opening by a little aperture not larger than the opening of the usual canals. I presume it is a sensitive tactile organ (Pl. IX, fig. 224).

(5) Gen. TRIGONIULUS sens. strict.

The internal branch of the posterior gonopod is broad and covered with fine hairs. A separate tarsus is not visible. Basal joint of anterior gonopods broad, leaf-like. Coxae of the anterior legs with or without apophyses. Tarsal pads present or wanting. Metasomites without lateral teeth. Pores in the prosomite.

Numerous species from the whole Indo-Australian Region, the Seychelles, Madagascar. I gave a tabular view in the Indo-Austral. Myr. in Arch. f. Nat., 1914.

Type.—*Trigoniulus lumbricinus* Gerst.

(6) Gen. EUCARLIA Bröl.

1913. *Eucarlia* Brölemann, Bull. Soc. Ent. France, No. 19, p. 478.

1914. *Eucarlia* Brölemann, Ann. Soc. Ent. France, lxxxiii, p. 33.

Basal joint of the anterior gonopod broad, leaf-like, distal joint deeply sinuate. The internal branch slender, the external branch broad, rounded. The seminal duct opens at the tip of the slender, pointed, and smooth (not hairy) tibial process. Telopodite without visible division. Anterior legs with or without apophyses on the coxae and tarsal pads. Pores in the prosomite.

E. haemoranthus Poc., *harpagus* Att., *karykinus* Att., *tachypus* Poc., *uncinatus* Att., *urophorus* Poc., *velox* Carl., *venatorius* Silv., from the Indo-Australian Region and Seychelles.

(7) Gen. SPIROSTROPHUS S. and Z.

1902. *Spirostrophus* Saussure and Zehntner in Grandidier's Madagascar, pp. 114–150.

1910. *Spirostrophus* Attems, Voeltzkow's Reise Ost-Afrika, p. 91.

1913. *Spirostrophus* Brölemann, Rec. Austral. Mus., x, p. 112.

Basal joint of anterior gonopod slender, rod-like. The coxa of the posterior gonopod contains two bladders connected together, into the first the prostate duct opens, the seminal duct begins at the second. The tibial process of the posterior gonopod is broad, rounded, smooth, not covered with hairs or spines; the seminal duct opens in the process by a funnel-shaped enlargement. Telopodite without division. Coxae of anterior legs with apophyses. Tarsal pad wanting. Pores in the prosomite.

Species: *S. naresii* Poc. (Seychelles, Madagascar, Caroline Islands, Marshall Island); *S. ambonensis* Attems (Ambon, Celebes); *S. digitulus* Bröl. (Queensland).

(8) Gen. *CHERSASTUS* nov.

Basal joint of anterior gonopod broad, rounded; distal joint without deep sinus. Sternite triangular. Tibial process of the posterior gonopod broad, rounded, smooth, sometimes wanting; the seminal duct opens by a funnel-shaped enlargement. Telopodite without division. Coxae of anterior legs without apophyses. Tarsal pads present or wanting. 2+2 supralabral pits, antennae with four sensitive cones. Cheeks of male with conical prominence. Sides of collum symmetrically narrowed and of usual length, not reaching the ventral surface. Horseshoe-shaped impressions (scobinae) sometimes present. Pores in the prosomite. Transverse suture not visible dorsally, or only in traces. Anal segment dorsally rounded, without prominent tail.

Distribution.—South Africa, Sunda Archipelago, Seychelles.

We know that in the *Spiroboloidea* a displacement of the anterior pairs of legs has taken place. In the *Diplopoda* generally the first segment is apodous, the second, third, and fourth segments have one pair of legs, and the fifth and following segments have two pairs. Here, in *Chersastus* (and the other *Spiroboloidea*), the fifth segment has but one pair of legs, the sternite is firmly connected with the tergite; the prophragma is closed ventrally by a narrow buckle, the coxae are inserted in two excavations, open behind, on the posterior border of the sternite. The fourth segment is quite like the fifth; its pair of legs belongs originally to the fifth segment, but is now completely separated from the fifth segment and its sternite fused with the tergite of the fourth segment. It is the same with the third segment as with the fourth and fifth, but the prophragma is interrupted ventrally. The tergite or pleurotergite of the second segment is broadly open ventrally. The sternites of the second pair of legs (belonging originally to the third segment) are connected by membranes with this pleurotergite; the first pair of legs is attached also by membranes in front of the second pair, not clearly belonging either to the second or the first segment. In a preparation the first pair of legs remains attached to the head. In the first and second pairs of legs the sternite is divided in the median line; each half is solidly connected with the coxa: we call it a "pair of sternocoxites."

Synopsis of Species of the Genus Chersastus.

- 1a. Anterior legs without tarsal pads 2.
- 2a. Tibial process of posterior gonopods wanting, metasomites smooth dorsally (Mahè.) *braueri* Attems.
- 2b. Tibial process distinct; metasomites dorsally striated (Borneo) *badius* Attems.
- 1b. Anterior legs with tarsal pads 3.
- 3a. The tibial process is a hollow, transversely divided lamella, lying in the excavation of the telopodite (Ternate, Halmaheira) . . . *orinomus* Attems.
- 3b. The tibial process has the usual shape, a smooth rounded lobe not sunk into a cavity, but free 4.
- 4a. Transverse suture dorsally visible. Prosomite in front of the suture roughly punctate; border of anal valves high and sharply defined (Bayan, Moluccas) *brachyurus* Attems.
- 4b. Transverse suture dorsally invisible; prosomite dorsally smooth or with fine transverse striae, not with rough punctuation. Margin of anal valves thickened but not sharply defined 5.
- 5a. The distal joint of the anterior gonopods incrassate at the tip. Without lateral lappets: the body dark red without black spots or bands (3) *ruber* n.sp.
- 5b. The distal joint of the anterior gonopods with 1-2 lateral lappets at the tip. The body not uniform red, but with annulations or with dark spots or bands 6.
- 6a. All legs padded 7.
- 7a. 44-45 segments; the sternite of the anterior gonopods reaching to the middle of the gonopods. The anal scale a blunt triangle . . . (1) *fasciatus* n. sp.
- 7b. 40 segments; the sternite of the anterior gonopods reaching nearly to the tip of the gonopods. The anal scale truncate . . . (2) *splendidus* n. sp.
- 6b. The last 12-20 pairs of legs not padded 8.
- 8a. From the medial margin near the tip of the distal joint of the anterior gonopod rises a little lappet directed laterally. Colour of the body red, with a row of black spots or a black band in the median line 9.
- 9a. No scobina (4) *silvanus* n. sp.
- 9b. Scobina well developed (5) *vulpinus* n. sp.
- 8b. On the lateral side near the tip of the anterior gonopod a pointed cone. Colour of the body brown or black, indistinctly annulated (6) *atrophus* (7) *inscriptus*.

163. (1) *Chersastus fasciatus* n. sp.

(Pl. IX, figs. 216-220.)

Colour reddish-brown or yellowish-brown, with three black longitudinal bands. The reddish spaces between the three bands as wide as the median black one. The pores are situated in the middle of the lateral black bands. The bands begin on the second and finish on the penultimate segment. Anal segment dorsally black, the valves yellow, antennae and legs reddish or yellowish. Clypeus reddish-brown, vertex black, collum black with red borders. ♂ width 5 mm.; number of segments 44-47.

Labral sinus triangular; the labral border is deeply incised in the

middle, with a strong tooth on each side of the incision. The incision is continued by a sharp furrow on the clypeus, becoming shallower and disappearing gradually before reaching the line between the antennae. 2+2 supralabral pits. Vertex with short furrow, the rest smooth. Eyes round, the inner border not overlapping much the base of antennae. The interorbital space more than twice the diameter of an eye. The ocelli moderately convex. Antennae overlapping the posterior border of the second segment. Four sensitive cones. The tip moderately thickened. Cheeks with conical process, their margins not bordered. Sides of the collum symmetrically narrowed, the anterior margin with a small border beginning at the eyes; no furrows. Anterior concealed part of prosomite with weak, irregular transverse striae becoming dorsally longer and deeper towards the open part. Two little horseshoe-shaped impressions very distinct, becoming more and more pointed and triangular. The sides and the under surface of the prosomite with fine oblique striae; the striae very irregular. The transverse suture is only visible ventrally up to the pore, and is even here very weak and indistinct; dorsally it is completely invisible. The pores beginning on the sixth segment are just in front of the suture. Metasomite with fine, regular longitudinal striae from the sternite up to half-way to the pore; the dorsum with scattered punctuation; the rest smooth and shining. Sternites with regular transverse furrows; stigmata rounded, not overlapping the sternite. Dorsal margin of anal segment with blunt angle, the process not overlapping the valves and not separated by a furrow; the angle somewhat rounded. The margins of the anal valves thickened, the thickening not abrupt, but gradually passing into the valves. Anal scale triangular, the apex rounded. Coxae of all legs without apophyses. Pad present on the last pair of legs, projecting to the middle of the terminal claw (fig. 220).

Gonopods: sternite of anterior gonopods (figs. 216, 217) V-shaped, the sides strongly curved and projecting as far as the middle of the anterior gonopods. The sides are completely fused with the tracheal stalks, which are only an irregular enlargement of the sides of the sternite; they are without distinct internal branch, and curved somewhat to the aboral side. The basal joint (fig. 216 *b*) of the anterior gonopods is a hollow leaf-like structure which sends a pointed keel to the aboral side. The distal joint (*d*) is inserted on the margin of this edge; its tip is narrowed and bears a transverse, outwardly directed process.

Posterior gonopods (figs. 218, 219): sternite (*v*) and coxae (*c*) com-

pletely fused. The sternite (*v*) is V-shaped and its sides pass without suture into the coxae. The tracheal stalks (*Tr.T*) are flexibly inserted on the sides of the coxae. In the interior of the coxae we see the thick-walled bladder (fig. 218 *Bl*) into which the prostate duct opens. This bladder is connected with a strongly chitinised knob (*K*), whilst the remainder of the wall of the coxae is membranous; an arrangement designed to exert a pressure on the full bladder at the right moment. Between the coxae and telopodite there is an articulation. The internal branch, *i.e.* tibial process (*Tf*), is short, broad, and smooth, and contains the opening of the seminal duct (*S.d.*). The tip of the telopodite has several lobes, one of them covered with little spines similar to the tibial process of *Trigoniulus*; but the tibial process of *Trigoniulus* and the lobe here are not identical. Characteristic of this species is a simple finger-like process at the tip of the telopodite (fig. 219 *f*).

Cape Province.—Gordon's Bay, Stellenbosch (23393, 13505); Hermanus (23370); Simonstown Waterfall (7720); River Zonder End (B. 5279, B. 5277); Steenbrass, Caledon Div. (B. 3364, A. 2333); Cookhouse (B. 865); Hout Bay Valley (7624, B. 2238); St. James (B. 958); Prince Albert (1543); Houw Hoek, Caledon (7348); Maitland Flats (7662); Platteklip Ravine, Table Mt. (1516, 1524); Grahamstown (A. 23385); Retreat, Cape Flats (7625); Graaff-Reinet (B. 1010); Tulbagh (B. 4074); East London (A. 23390); Pocaltsdorp (7396). *Natal*.—Merebank, Durban (150182, only a female; doubtfully of this species).

164. (2) *Chersastus splendidus* n. sp.

(Pl. XXII, figs. 516–519.)

Colour: head and collum dark red; the dorsum of the prosomite light red with a median black spot; the dorsum of the metasomite blackish up to the line of the pores; in the last third of the body the darkening spreads beyond the pores; the sides and the under side of the prosomite and metasomite dark red. Antennae and legs reddish-brown; the tip of the tarsus and the pad yellow.

The head, collum, and mandibles like those of *C. vulpinus*. The metasomite and the free part of the prosomite very finely wrinkled, leather-like. The sulci of the prosomite and metasomite, the position of the pore, and the transverse sulcus like that of *C. vulpinus*. Behind the pore a sharp furrow not touching the posterior margin. No scobina. The medial margin of the anal valves not thickened; the anal scale nearly truncate; the dorsal angle blunt. The sternites

with some sharp cross furrows in the anterior part. All the legs are padded.

Gonopods : the sternite of the anterior pair (figs. 516, 517) is broadly rounded and relatively long, reaching nearly to the tip of the anterior gonopods. The basal joint of the gonopod has a distinct shoulder, and becomes a blunt cone distally from the shoulder. The distal joint is broadly rounded and bears near the tip a triangular lappet directed laterally. The tip is somewhat swollen and perforated by small pores. No hairs. The sternite of the posterior pair (figs. 518, 519) is a broad V with blunt angle. The base of the gonopod surpasses the sternite with a thickly chitinated blunt lappet. The telopodite is well defined ; the base is narrowed ; the prostate canal runs to a broad, short lappet ; the tip is broadly rounded.

Masiene, Chai Chai, Portuguese E. Africa (6034).

165. (3) *Chersastus ruber* n. sp.

(Pl. IX, figs. 221-223.)

Colour very remarkable : the whole trunk a pretty deep-red ; head, antennae, and legs black, the legs on the outside whitish. ♂, 44 segments ; width 5.3 mm. ; ♀ 7.2 mm.

Anterior border of labrum nearly straight, with four short, rounded teeth. Labral sinus very shallow ; a median furrow passes from the anterior border of the clypeus to the elevation between the antennae. This furrow is deep in the fore part, then gradually shallows. 2+2 supralabral pits. Vertex line very short. The whole of the rest of head smooth. Eyes spherical, triangular, the single ocelli distinctly convex. Antennae reaching the posterior border of the third segment. Cheeks with broad process and a small border on the anterior margin. Collum laterally broadly rounded. The anterior margin of the sides finely bordered. Ventral surface and sides of prosomite densely covered with fine oblique striae ; dorsally these striae are present only in a median zone ; the fore and the hind parts are smooth. Metasomites on the ventral surface with regular widely spaced longitudinal furrows. A distinct transverse suture is lacking. It is represented by a shallow depression at the sides, the pore being situated before the end of this depression. The dorsum of the metasomites smooth, with very fine punctuations. Prosomites with two little horseshoe-shaped impressions. Sternites transversely striated. The dorsal margin of the anal segment bluntly angulate, with rounded apex. The valves moderately raised, the margin very thick but not marked off. Anal

scale arched and pointed. Anterior legs without apophyses. The pads wanting on the last 14 pairs of legs. Gonopods: seventh segment closed ventrally. Sternite (fig. 222) of anterior gonopods pointed and relatively short. Basal joint with internal margin straight, the terminal margin oblique, connected by a wide arch with the outer margin. The tip of the second joint with a thick black knob, bearing a little lobe (fig. 221). Posterior gonopods: coxa as described in the preceding species. Tibial process broad, projecting but little, with a smooth margin. Between the tibial process and the round-lobed tip a little pointed lobe (fig. 223).

Umzimkulu (A. 23381), Natal; Kentani Distr. (13771), Cape.

166. (4) *Chersastus silvanus* n. sp.

(Pl. IX, fig. 225; Pl. X, figs. 226, 227.)

Colour deep reddish-brown, with three very indistinct black longitudinal bands. ♂, 44 segments; width 4.3 mm.; ♀ 5.4 mm.

Labral margin nearly straight, four labral teeth, the outer two somewhat indistinct; lateral sinus flat; the clypeus with a median furrow from the anterior margin to the antennae, gradually disappearing. The single ocelli distinctly convex. Collum as in *fasciatus*. The sculpture of pro- and meta-somites is the same as in *C. ruber*, but horseshoe-shaped impressions are not visible. Sternites and anal segment also as in *C. ruber*. The tarsi padded from the third to the twentieth before the end. Gonopods: The sternite of the anterior gonopods (*v*, figs. 226, 227) is slender and overlaps the middle of the anterior gonopods. The basal joint (*b*) has no characteristic shape as in most other species. The second joint (*d*) is broadly rounded and bears on the inner side near the tip a slender, outwardly directed lobe and a short, broad lobe with small, pointed hairs. Posterior gonopods (fig. 225): the tibial process is short, broad, with smooth margins; the tip is a blunt, inwardly curved lobe; in the sinus between the tibial process and the lobe at the tip there is a little rounded lobe.

Knysna (1547, 1546); Kentani Distr., Transkei (7301), Cape.

167. (5) *Chersastus vulpinus* n. sp.

(Pl. XXII, figs. 520-526.)

In colour resembling *C. ruber*; dark red, a black spot in the posterior half of each prosomite in the median line, and surrounding each pore. The head, including the antennae, black; the legs black with whitish gloss. ♂ width 6.2-7 mm., ♀ 7-8 mm. Forty-four segments.

The labral margin nearly straight, the anterior margin of the clypeus a blunt angle. 2+2 supralabral pits, wide apart. On the median angle begins the deep median furrow, running up to the antennae. The longitudinal sulcus short; head-plate smooth. The eyes round. The antennae surpass a little the third segment. Four sensitive cones. The basal joint of the mandible in the ♂ with a blunt tooth, indistinctly bordered on the anterior margin.

Collum narrowed laterally, the anterior margin finely bordered. Prosomite finely sulcate; the sulci on the exposed ventral surface are longitudinal, on the sides and on the concealed surface ventrally they are oblique, on the dorsal they run transversely. Metasomite with fine longitudinal sulci, the upper not reaching the pore. From the pore runs a sharp furrow to the posterior margin. The surface of the metasomite very smooth and shining. The pores are situated in front of the transverse sulcus; the latter distinct only beneath the pore. Distinct scobina present, except on some of the first and last segments. The anal segment smooth, the posterior dorsal angle blunt; the inner margin of the anal valves gradually rising to a smooth thickening, the anal scale rounded. The legs padded from the third pair, the last seventeen pairs not padded. The sternite of the anterior gonopods (figs. 521, 522) is pointed and relatively short, and reaches approximately to the middle of the anterior gonopods. The basal joint is weakly shouldered. The distal joint is narrowed distally and the tip is somewhat incrassate, and perforated by numerous fine and some larger pores; on the aboral side weakly hollowed out before the thickening, and bearing a little lappet directed laterally. No hairs. The sternite of the posterior pair (figs. 520, 523) is a cross-buckle, united with the joint connecting the bases of the gonopods. The telopodite is distinctly separated from the coxite laterally. The vesicle at the beginning of the prostate canal is distinct. The canal runs to a little lappet. The tip of the broad telopodite is divided into two rounded lappets; before them there is a little spine.

Masiene, Chai Chai, Portuguese E. Africa (B. 6030, 6009).

168. (6) *Chersastus atrophus* n. sp.

(Pl. X, figs. 228-230.)

Colour blackish-brown, posterior border of metasomites transparent. Head yellowish-brown, blackish between the eyes. Antennae and legs yellowish. ♂, 44-46 segments; width 2.5-3 mm.

Anterior labral margin deeply sinuate, in the middle an incision,

a tooth on each side. Posterior margin of labrum angular. 2+2 supralabral pits. The median furrow on the clypeus as in the other species. Head shiny. Vertex line short. Antennae reaching posterior border of third segment. Cheek without prominence. Collum symmetrically rounded laterally, anterior margin of sides finely bordered, as in other species. A transverse suture not visible at the sides, only an indistinct depression there, the pore being just in front of this depression. The sides of the prosomites as far as the pore with very fine oblique striae. Ventral surface of metasomites with fine longitudinal furrows. The dorsum of prosomites and metasomites with fine punctuation and fine short striae; horseshoe-shaped impressions not visible. Dorsal margin of anal segment with blunt angle, the apex rounded. The valves little raised, the thickened margin not marked off. Scale broadly arched. Sternites with transverse furrows. The tarsal pads wanting on the last 5-8 pairs of legs. Anterior legs with apophyses on the coxae.

Gonopods: sternite of anterior gonopods (*v*, figs. 228, 229) relatively long but rounded. Basal joint (*b*) of anterior gonopod forming a pointed angle. Distal joint shaped like a bird's head, with a lateral tooth ("the bill"), the tip covered with small, pointed hairs. The tibial process of the posterior gonopod short, broadly rounded. On the inner side distally to the tibial process (*Tf*) several short, rounded lobes (fig. 230).

Orange Kloof Nek, Hout Bay, Cape Peninsula (7649); Signal Hill (1509), Cape Town; Wellington (13498), Cape.

169. (7) *Chersastus inscriptus* n. sp.

(Pl. X, figs. 231-235.)

Prosomites olive-brown, metasomites black, the two colours merging gradually. Clypeus, antennae, and legs dark yellowish-brown, vertex black-brown. Collum black-brown, the anterior margin reddish. ♂, 43 segments; width 5 mm.

Anterior margin of labrum deeply sinuate, four labral teeth, posterior margin bluntly angled. 2+2 supralabral pits. The median furrow, as in the allied species, disappearing before the antennae, in the fore part moderately deep. Vertex line somewhat longer than in allied species, head very smooth. Sides of the collum nearly pointed, the anterior margin finely bordered. Ventral surface and sides of the prosomite densely covered with fine oblique striae. The covered part of the dorsum with fine concentric striae; besides these

there are two shallow, horseshoe-shaped pits, recalling the scobinae of *Rhinocricus*, but much less distinct than these. Free part of pro-somites with irregular short striae. Metasomites dorsally smooth and polished, ventral surface with the usual longitudinal furrows. The transverse suture is indicated ventrally up to the pores by a shallow depression. The dorsal angle of the anal segment blunt, the apex rounded. Anal valves moderately raised, the margin very thick and somewhat separated. Sternites with transverse furrows. Tarsal pads wanting on the last 14 pairs of legs. Gonopods: the sternite of the anterior gonopods (figs. 231, 232) prominent up to the middle of the gonopod; basal joint (*b*) broad, second joint (*d*) somewhat narrowed, with two lateral lobes. The summit (*k*) covered with little knobs, each bearing a small spine (fig. 233). Tibial process (*Tf*) of the posterior gonopod broad, projecting a little; the tip broadly lobed, inwardly curved (figs. 234, 235).

Scottburgh (A. 23350), Natal.

Species Spiroboloideorum incertae sedis.

Spirobolus arcuosus Por.

1893. Porat, Bih. Sv. Ak. Handl., xviii, p. 31.
Damaraland.

Spirobolus coriaceus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 19.
Caffraria.

Spirobolus digrammus Poc.

1893. Pocock, Ann. Mag. Nat. Hist., (6), xi, p. 138.
Cape Town.

Spirobolus elegans Brandt.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 19.
Caffraria.

Spirobolus formosus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 18.
Caffraria.

Spirobolus littoralis Koch.

1865. Koch, Verh. Zool. Bot. Ges., xv, p. 884.
Algoa Bay.

Spirobolus pococki Por.

1893. Porat, Bih. Sv. Ak. Handl., xviii, p. 32.
Cape Town.

Spirobolus sabulosoides Por.

1893. Porat, Bih. Sv. Ak. Handl., xviii, p. 33.
Cape Town.

Spirobolus saussurei Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 20.
Caffraria.

Spirobolus strigosus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 17.
Caffraria.

Spirobolus tessellatus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 21.
Caffraria.

SUBORDER SPIROSTREPTOMORPHA.

SUB-SUBORDER CAMBALOIDEA.

Gnathochilarium: in front of the hypostoma is the undivided, well-developed praebasilare, and in front of this the united duplomentum (in the sense of Verhoeff) or the mentum and promentum (the latter separated from the mentum). The promentum may be divided longitudinally. The duplomentum or the promentum generally separate the lamellae linguales completely or nearly so. The stipites are contiguous with the praebasilare and laterally surround the mentum. Cardines are present. The three last joints of the legs of the ♂ are never padded.

With regard to the gonopods there are great differences. Both pairs of legs of the seventh segment may be transformed into gonopods or the second pair may be wanting. The first pair may possess a sperm cavity and sperm canal or not. A coxal gland (prostate gland) may be present on the first or second pair. The second pair may have several (3) joints and arrangements for the conduction of the sperm, or may be a little undivided stump, or wanting altogether. The pores begin at the fifth or sixth segment. The metasomites are either smooth or have strong keels. The first pair of legs of the ♂ has usually a reduced number of joints altered in shape. The first pair of legs is never normal and equal to the second pair.

Key to the Families of Cambaloidea.

- 1a. Gnathochilarium with duplomentum (*i.e.* the promentum not separated from the mentum) . *Cambalopsidae* Cook (genera *Cambalopsis*, *Cambalomorpha*, *Trachyiulus*).
- 1b. Mentum and promentum separated 2.
- 2a. Promentum divided longitudinally 3.
- 3a. Posterior gonopods wanting; anterior gonopods 2-jointed, the second joint strongly bristled. Pores beginning from the fifth segment
Pseudonannolenidae Silv. (genus *Pseudonannolene* Silv.).
- 3b. Posterior gonopods 3-jointed. Anterior gonopods 1-jointed; without bristles.
The pores begin on the sixth segment . *Pericambalidae* Silv. (genus *Pericambala* Silv.).
- 2b. Promentum undivided *Cambalidae* sens. strict.

Fam. CAMBALIDAE sens. strict.

In South Africa this family is only represented by a single genus. A short diagnosis is as follows:—Gnathochilarium: the mentum *sens. lat.* is divided into mentum and promentum, the promentum is not divided longitudinally and almost completely separates the lamellae linguales. Gonopods: sternite and tracheal stalks of anterior gonopods fused into one piece. Anterior gonopods generally 2-jointed, rarely 1- or 3-jointed. The coxae may possess a gland whose duct opens on a pseudoflagellum. Telopodite of anterior gonopods often with seminal duct. The sternite of the posterior gonopods is of one piece, or is divided in the middle line. In all cases it is fused with the tracheal stalk, but not with the gonopods. The gonopod is a little 1- to 3-jointed stump, whose tip is adpressed to the base of the anterior gonopod in its natural position. First pair of legs of the ♂ modified in different degrees. The sternite may be one piece or divided in the middle line, fused with the coxae or not; the leg may be reduced to a stump of one or two joints or may have 5–6 joints. Tracheal stalks fused with the sternite or free. The coxae of the second pair of legs of ♂ may be fused with the sternite; otherwise there are six normal joints. Certain legs may have teeth or prominences on certain joints; the three last joints are never padded. The transverse suture is distinct, the metasomites are smooth dorsally (only the genus *Cambala* has strong dorsal keels, but its position in this family is still uncertain); the ventral surface has fine, regular furrows. The pores begin on the fifth (seldom) or sixth segment. Usually three, seldom one labral

tooth. Antennae with four sense cones. Mandibles with 6-12 comb-like lamellae. Dorsal margin of anal segment without tail.

The name of this family is somewhat unfortunate, since the genus *Cambala*, which gave its name to the family, is so little known as regards its most important characters that it is uncertain whether it belongs to this family at all; so that we have possibly a family *Cambalidae* without the genus *Cambala*. A remarkable similarity in appearance exists between *Glyphiulus* and the *Cambalopsidae*; both have the same strong dorsal keels, but are sharply separated in the form of the gnathochilarium.

While I must exclude several genera from the family *Cambalidae*, on the other hand I must include a genus whose position has been somewhat uncertain hitherto, viz. the genus *Epinannolene*. Carl,* who first described several species in an excellent manner, placed *Epinannolene* in the family *Nannolenidae* Cook. This family has had a fate similar to that of the *Cambalidae*. The genus *Nannolene* is very incompletely known, so that we cannot determine its true character; and consequently, as the whole definition of the families *Nannolenidae* and *Cambalidae* is somewhat vague, we cannot determine the characters of the family of which it is the type. On this point I am in agreement with Carl, who left the question open in which family *Epinannolene* was to be placed. He attaches great importance to the fact that *Epinannolene* has only one pair of gonopods, the posterior pair being atrophied or nearly so. He found in one species no traces of this pair, in another species he found a pair of little 3-jointed stumps, so that the differences between the other genera of *Cambalidae* and *Epinannolene* are bridged over.

Key to the Genera of *Cambalidae*.

- 1a. Coxite of the anterior gonopod with a flagellum moved by muscles 2.
- 2a. Telopodite of the anterior gonopod with a pseudoflagellum. Praefemur of the first pair of legs of ♂ much reduced *Proscelomerion* Verh.
- 2b. Telopodite of the anterior gonopod without pseudoflagellum. Praefemur of first pair of legs of ♂ large 3.
- 3a. Sternite of first pair of legs bipartite, the femur much broader than long. Anterior gonopod inarticulate, the posterior gonopod indistinctly 2-jointed *Samichus* Att.†

* Carl, Die Myr. von Columbia, Mem. Soc. Neuchatel. Sci. Nat., vol. v, 1914.

† *Amastigogonus* Brölemann 1913, Rec. Austral. Mus., x, p 152, is synonymous with *Samichus* Att.

- 3b. Sternite of first pair of legs not divided, the femur longer than wide, much narrower than the praefemur. Both pairs of gonopods distinctly articulate (coxite and telopodite); the telopodite of the posterior gonopod 1- or 2-jointed. Certain joints of the 3rd to the 7th pair of legs of the ♂ with ventral teeth. *Dimerogonus* Att.
- 1b. Coxite of anterior gonopod without flagellum 4.
- 4a. Metasomites with strong longitudinal keels. Pores beginning from the 5th segment *Glyphiulus* Gerv. 5.
- 4b. Metasomites without keels 5.
- 5a. Pores beginning on the 5th segment *Epinannolene* Bröl. 6.
- 5b. Pores beginning on the 6th segment 6.
- 6a. Sternite of the first pair of legs divided longitudinally, each half coalescent with the tracheal stalk but not with the coxite; the first legs 5- or 6-jointed. Prosomites with finely punctuate circular ridges *Dinocambala* Att.
- 6b. The sternite and the coxae of the first pair of legs coalescent. Prosomites without circular ridges 7.
- 7a. Telopodite of first pair of legs of the ♂ 2- or 3-jointed *Podykipus* Att.
- 7b. These telopodites are 5-jointed 8.
- 8a. Telopodite of the anterior gonopod with a pseudoflagellum, which is freely visible and surrounded by strong bristles *Merioproscelum* Verh.
- 8b. The pseudoflagellum of the anterior gonopod, if present, concealed 9.
- 9a. Posterior gonopod 2- or 3-jointed. Metasomites with two rows of little hairs or densely hairy. Anal valves hairy *Agastrophus* Att.
- 9b. Posterior gonopod inarticulate. Metasomites and anal valves not hairy 10.
- 10a. Femur of the first pair of legs of the ♂ relatively slender, much narrower than the broad praefemur *Atelomastix* Att.
- 10b. Femur of first pair of legs very short and broad, as broad as the praefemur 11.
- 11a. This femur with an anterior horn-shaped process directed laterally. Posterior gonopod larger than in *Julomorpha* and articulate (coxite and telopodite) *Thaumaceratopus* Verh.
- 11b. Femur of first leg without horn-shaped process. The posterior gonopods small, inarticulate stumps *Julomorpha* Por.

Gen. JULOMORPHA Porat.

1872. Porat, Öfvers. Vet. Ak. Förh., Nr. 5, p. 13.

1909. Attems, Deutsche Südpolar Exped., p. 429.

1. Subgen. JULOMORPHA nov.

Three labral teeth. No bristles on the vertex. Eyes rounded, with numerous ocelli in several rows. Head smooth. Trunk cylindrical, without constriction on the first segments. Width of body 1·3-3 mm., ♂ with 48-63 segments. The posterior part ($\frac{1}{3}$ or $\frac{1}{2}$) of every metasomite transparent, so that an indefinite transverse annulation results. The dorsum banded with yellow only in *J. rixosa*. Metasomites

smooth, not hairy, without strong sculpture, ventral surface with the usual longitudinal furrows, curved upwards to meet the transverse suture. Pores beginning on the sixth segment in the space between the well-developed suture and the posterior margin, Dorsal margin of anal segment with blunt angle or rounded, not forming a tail. Anal valves strongly raised, the margin deepened, but rarely bordered; beside the margin two bristles. Anal scale broadly rounded. ♂, first pair of legs 5-jointed; the coxae nearly fused with the undivided sternite, the second joint with a rounded basal lobe on the oral side, then three little joints, the last clawless. All joints with numerous unicellular glands. Second pair of legs 6-jointed, of normal size.

Anterior gonopods: sternite and tracheal stalks fused into one piece. The gonopods set close to one another and the connection with the sternite only membranous. The gonopod is 2-jointed; the arrangement for the conveyance of the sperm is clearly seen. Near the base of the telopodite there is a deep round cavity, whose border is beset with thin fringes. The cavity is the beginning of the seminal duct (*sd*) leading into a wide pouch, the seminal pouch (*sp*). This arrangement is very distinct in *Julomorpha kinbergi*, *fortis*, *ignavus*, and *hilaris*, species which also fall into line with regard to the posterior gonopods; the pouch of *J. tristis* and *tardus* has a somewhat different shape. The species *Julomorpha concors* and *rixosa* have anterior gonopods of a second type. The telopodite is spoon-shaped, with various processes in the interior of the cavity. The external margin of the coxite is graduated like steps and terminated by a long slender lamella lying close to the corresponding lamella of the other side. The third type of anterior gonopods is represented by *Julomorpha celer*, *cicur*, and *rudis*, where the seminal duct does not open as a wide pouch, but as a narrow canal; the coxa is wide and rounded. I have not been able hitherto to detect a coxal gland.

Posterior gonopods: sternite and tracheal stalks fused. The gonopod is a little 1-jointed stump. We can distinguish two types. In the first, represented by *Julomorpha kinbergi*, *fortis*, *ignavus*, *hilaris*, and *concors*, the whole gonopod is straight and both gonopods are parallel; the terminal pad has a little tooth on the median side. In the second type, viz. in *celer*, *cicur*, *rixosus*, *rudis*, *tardus*, and *tristis*, the gonopods are a little divergent in their distal half and the terminal pad has no tooth on the inner side. The long tooth on the outer side is the same in both types.

The species are so similar in appearance that it is for the most

part impossible to distinguish the females. To avoid repetition I will give a full description of only one species, *J. kinbergi*, referring to this as regards all points not dealt with in the rest of the diagnoses. Besides the South African species mentioned here there are in the literature three species of *Julomorpha*: two from Queensland and one from the Philippines; only females, however, are described, and it is very probable that they do not belong to *Julomorpha* in the sense adopted here.

Key to the Genus Julomorpha, subgen. Julomorpha sens. strict.

- 1a. Lateral margin of coxite of anterior gonopods step-like. The slender terminal lamellae of the two coxites lie close together and are far exceeded by the telopodite. Telopodite trowel- or spoon-shaped 2.
- 2a. On the inner side of the terminal pad of the posterior gonopods a little tooth. Large denticulate or fringed lobes in cavity of telopodite of anterior gonopods. Transverse suture replaced by a shallow depression with longitudinal furrows. Dorsum black (5) *concors* n. sp.
- 2b. Posterior gonopods without inner tooth. Cavity of telopodite densely covered with little bristles or spines. Transverse suture normal. Dorsum with a broad, yellowish, longitudinal band (6) *rixosa* n. sp.
- 1b. Coxite of anterior gonopod broad, rounded, with various lobes, etc., but without a slender terminal lamella lying close to that of the opposite side 3.
- 3a. On inner side of terminal pads of posterior gonopods a little tooth; the whole gonopod straight. Coxite of anterior gonopod with various lobes 4.
- 4a. At tip of telopodite of anterior gonopod no denticulate inner lobe and no long spine (1) *kinbergi* Por.
- 4b. Telopodite of anterior gonopods bears a slender spine, besides the bristled cone and a denticulate lobe 5.
- 5a. The bristled cone exceeds the small central spine. The denticulate lobe is represented only by a swollen eminence at the base of the central spine (3) *hilaris* n. sp.
- 5b. Bristled cone and central spine equal in length 6.
- 6a. Denticulate lobe of telopodite directed straight upwards. Central spine without lateral teeth. Lateral lobe of coxite more sinuate (2) *fortis* n. sp.
- 6b. Denticulate lobe turned outwards; central spine with some lateral teeth. Lateral lobe of coxite very slightly sinuate (4) *ignava* n. sp.
- 3b. Terminal pad of posterior gonopods without inner tooth. Distal halves of posterior gonopods somewhat divergent. Coxite of anterior gonopod simply broad and rounded 7.
- 7a. Deepened margin of anal valves finely edged (gonopods as in *cicur*) (7) *celer* n. sp.
- 7b. Deepened margin of anal valves not edged 8.
- 8a. Seen from aboral side, telopodite of anterior gonopods is a broad plate without a prominent ramus (8) *tristis* n. sp.
- 8b. Telopodite of anterior gonopods bears a slender, prominent ramus on the outer side which is also visible from the aboral side 9.

- 9a. This ramus has one point (9) *tarda* n. sp.
 9b. Ramus has two points 10.
 10a. The deep sinus between the median bristled lamellae and the lateral branch of the telopodite of anterior gonopods is visible from the aboral side. The posterior gonopod develops a rounded, hairy shoulder before turning outwards (10) *cicur* n. sp.
 10b. The lateral branch rises from the oral plane, so that no sinus is visible on the aboral side. The inner margin of the posterior gonopods has no shoulder, but passes gradually into the distal outwardly directed part
 (11) *rudis* n. sp.

170. (1) *Julomorpha kinbergi* Por.

1872. *Julomorpha kinbergi* Porat, Myr. Afr. Aust., Öfvers. Vet. Ak. Förh., p. 13.
 1907. *Julomorpha kinbergi* Attems, Myr. Deutsch. Südpol. Exp., p. 429.
 1909. *Julomorpha schultzei* Attems, Schultze's Forsch. Reise, p. 37.

(Pl. X, figs. 236-238.)

Colour black: the posterior half of the metasomite whitish and transparent, the sides with brown mottling. Head and collum dark brown with lighter mottling. Vertex black between the eyes. Antennae dark brown, legs yellowish-brown, anal valves brown. ♂, 49-56 segments; width 2 mm.

Anterior margin of labrum weakly sinuate, the three teeth short and blunt. Eyes rounded, the ocelli not numerous; the eyes surpass but little the inner base of antennae, consequently they are wide apart. Vertex line sharp. No bristles on the vertex. Antennae short, the tips but little swollen. Mandible with seven comb-lamellae; the principal tooth is relatively short and blunt and bears 1-2 lateral lobes. Tooth-plate with three short, broad, and blunt teeth; the first of them 2-lobed. Promentum of the gnathochilarium broad at the base. The corners rounded, the apex pointed; the lamellae linguales not completely separated by the promentum but touching one another. Stipites with a longitudinal row of seven strong bristles. Collum equal in both sexes, the sides symmetrically narrowed. Covered part of prosomite with several concentric furrows, metasomites on the ventral surface with longitudinal furrows, passing in a curve into the transverse suture. Dorsal surface smooth, a fine polygonal reticulation only visible under the microscope. No hairs on the metasomites. The transverse suture distinct; the little pores beginning on the sixth segment in the middle of the black part of the

metasomite ; the segment before the anal segment is without pores. Dorsal margin of anal segment rounded ; the valves strongly raised, the inner margin deepened but without border. The scale broadly arched. The whole anal segment shiny. Sternites smooth. The femur of the anterior legs of ♂ has a pad like the tarsi of many *Juloidea*.

♂, first pair of legs : sternite large and undivided ; coxae are fused with the sternite, but the sutures remain visible. The oral side of the second joint is somewhat excavated and bears a rounded lobe at its base. The third, fourth, and fifth joints are cylindrical, the last (fifth) is clawless and seems to have consisted originally of two joints, the dense cellular and glandular mass being present only in the first two-thirds, the tip contrasting clearly, but there is no suture. The intercalary plates are small, but strongly armoured. The sternite of the second pair of legs is small and fused with the tracheal stalks. The bases of the coxae are widened. The leg has six joints. The bipartite penis behind the second pair of legs is long.

Anterior pair of gonopods (figs. 236-238) : the sternite is fused with the tracheal stalks ; this piece is connected by a membrane with the two gonopods. Each gonopod is 2-jointed, the coxite (*Co*) is a long and broad folded leaf equal in length to the telopodite ; the margin in part broadly rounded, with several short teeth on the terminal margin. The telopodite (*Tel*) is triangular and bears a field of strong bristles near the tip. The basal cavity (*B*), the seminal duct (*sd*) and seminal pouch (*sp*) very distinct (fig. 238). Posterior gonopods : the gonopod is straight, the terminal rounded pad has a sharp tooth on the outer side, and a blunt tooth covered and half concealed by strong bristles on the inner side.

The gonopods of *J. kinbergi*, *ignava*, *fortis*, and *hilaris* are very similar, and are characterised by the large pouch on the telopodite of the anterior gonopods into which opens the seminal duct. As regards the tip of the telopodite we see a gradation in these species. In *J. kinbergi* this tip is a cone with a field of bristles on the oral side. In *J. hilaris* we find in addition a little curved, sharp spine whose base is raised and denticulate. In *J. fortis* and *J. ignava* the spine in the middle is large, equal in length to the bristled cone, and the denticulate eminence at the base of the spine becomes a separate denticulate lobe, straight and prominent in *J. fortis*, turned laterally in *J. ignava*.

Newlands, Table Mt. (7657) ; Signal Hill (7645) ; Table Mt. (B. 2227) ; Worcester (14646), Cape. It was recorded before from Simonstown and Cape Flats, Cape.

171. (2) *Julomorpha fortis* n. sp.

(Pl. X, figs. 239-242.)

♂, 59-63 segments; width 2.5 mm. Black.

The margin of the anal valves is somewhat bordered, not as distinctly as in *J. celer*; there is, however, a difference from *J. kinbergi*. Gonopods: the coxite of anterior gonopods (figs. 239-240) is a laterally compressed, hollow leaf-like structure with a broad, rounded lobe; at the tip a slender branch (*n*) whose surface has the same scale-like structure as the anterior gonopods of the Palearctic *Julus*. The telopodite (*Tel*) has three terminal branches: a denticulate straight lobe (*e*), a slender curved spine (*f*) without lateral teeth, and a bristled cone (*g*). On the interior surface of the telopodite we see very distinctly the basal rounded cavity, the seminal duct, and the long seminal pouch (fig. 242). Posterior gonopods (fig. 241) straight, parallel. The tooth on the inner side of the pad is nearly concealed by the numerous bristles. The lateral tooth is long and clearly exceeds the pad and the inner tooth.

Cape Peninsula (2323), Cape.

172. (3) *Julomorpha hilaris* n. sp.

(Pl. X, figs. 254-255.)

♂, 53 segments; width 2.5 mm.

The margins of the anal valves not bordered. The coxite of the anterior gonopods (fig. 255) is distinguished from that of *J. ignava* and *fortis* in that the terminal lobe (*n*) has no scale-like structure, and that seen in profile it does not appear in front of the outer lobe, but on the inside. The bristled cone (*g*) of the telopodite is large and long, the little curved spine (*f*) in the middle extends as far as the middle of the bristled cone, at its base is a swollen denticulate eminence instead of the denticulate lobe (*e*). Posterior gonopods equal to those of *J. kinbergi*.

Table Mt. (4095), Cape.

173. (4) *Julomorpha ignava* n. sp.

(Pl. XI, figs. 265-268.)

♂, 60 segments; width 3 mm.

Anal valves not bordered. Identical with *J. fortis* as regards the external features. The terminal lobe of the coxite of the anterior

gonopods is visible in profile (fig. 267) in front of the outer lobe, and its aboral side has the scale-like structure of *Julus* (fig. 268). The bristled cone (*g*) of the telopodite is remarkably pointed, the bristles nearly all arranged in a single regular row. The spine (*f*) in the middle is nearly as long as the bristled cone, and bears several little lateral teeth in its basal half. The denticulate lobe (*e*) is broad and turned outwards (figs. 265, 266). Posterior gonopods as in *J. kinbergi*.

St. James (B. 957), Kalk Bay (150114, 150120, 150197), Cape.

174. (5) *Julomorpha concors* n. sp.

(Pl. XI, figs. 260–264.)

♂ width 1·8 mm. Number of segments unknown. No uninjured ♂ in the collection. Colour dark brown; the legs, anal valves, and clypeus yellowish.

The transverse suture is represented on the dorsum and sides by a shallow depression with short longitudinal furrows; on the ventral side the suture is normal and linear; in front of the pore the row of little furrows is bent forwards. Gonopods very similar to those of *J. rixosa*. The external margin of the coxite (*Co*, figs. 260, 261) indented twice, like two steps. The narrow terminal lobe is shorter than in *J. rixosa* and not divided, the telopodite far surpasses the coxite. The telopodite (figs. 262, 263) boat-shaped; the cavity, turned inwards, contains a number of slender lobes, some fringed, some with a smooth margin, and a number of spines. On the outer side a row of spines. Posterior gonopods (fig. 264): the median pad is fairly broad, bears a tooth on the inner side, and is surpassed by the long and very pointed lateral tooth.

Hogsback (B. 808), Cape.

175. (6) *Julomorpha rixosa* n. sp.

(Pl. X, figs. 243–246.)

In colour it differs somewhat from the other species in having a broad, longitudinal, yellowish band on the dorsum, the rest of dorsum dark chestnut. ♂, 60 segments; width 2 mm.

Anal valves not bordered; the transverse suture normal on the dorsum. Gonopods: the coxite of the anterior gonopods (fig. 244 *Co*) is abruptly narrowed after the basal third; the terminal lobe is divided by a sinus into two lamellae, a longer aboral one and a shorter anterior one. The telopodite (*Tel*, figs. 243–245) far surpasses

the coxite. The telopodite is spoon-shaped as in *J. concors*; the aboral margin bears a row of strong bristles; the cavity is beset with short and blunt spines; at the tip are several little pointed cones. I was not able to detect a seminal duct, but having only one example I will not assert that it is wanting. Posterior gonopods (fig. 246): on the inner side no tooth; on the aboral side of the trunk several adpressed hairs; the tooth on the outer side long. The whole gonopod straight.

Hogsback (B. 808), Cape.

176. (7) *Julomorpha celer* n. sp.

(Pl. X, figs. 251-253.)

♂, 52-54 segments; width 1.5 mm. Black or blackish-brown.

The deepened margin of the anal valve is distinctly bordered. Gonopods very similar to those of *J. cicur*. The deep sinus between the inner bristled plate (*m*) and the outer branch (*l*) of the telopodite of the anterior gonopod (figs. 251, 252) is visible from behind. The outer branch surpasses the coxite (*co*), is curved inwards, and bears a pointed tooth on the outer side. The distal halves of the posterior gonopods (fig. 253) are divergent, the basal part straight, passing gradually and convexly into the distal outwardly directed part without forming a shoulder. No tooth on the inner side of the pad. The lateral tooth blunt.

Steenbrass River, Caledon Div. (2332); Hottentots Holland (7315); Houw Hoek, Caledon (7352, 7619); all Cape.

177. (8) *Julomorpha tristis* n. sp.

(Pl. XI, figs. 269-271.)

♂, 56 segments; width 1.3 mm. Dark brown, nearly black, the legs yellowish.

Margin of anal valves not bordered. Gonopods as a whole short and broad. The coxite of the anterior gonopods is a rounded, oblique, inwardly directed lobe (fig. 269). The telopodite is a broad, leaf-like structure; on the terminal margin a curved, pointed lobe in the shape of an S (*a*), a row of strong bristles and a group of curved bristles; the terminal lobe finely striated. The cavity, surrounded by slender fringes, and the seminal duct, opening in a cup with thin walls, are distinct (fig. 270). Posterior gonopods: the distal half turned a little outwards, the two gonopods consequently divergent;

the inner margin with numerous hairs, no shoulder. The lateral tooth short, no tooth on the inner side (fig. 271).

Ceres (7521), Cape.

178. (9) *Julomorpha tarda* n. sp.

(Pl. X, fig. 256 ; Pl. XI, figs. 257-259.)

♂, 48 segments ; width 1.3 mm. Colour dark brown, the posterior half of metasomites transparent ; clypeus, antennae, and legs yellowish-brown.

The deepened margin of the anal valves finely bordered. The coxite of the anterior gonopod (fig. 259) is a broad plate without peculiarities. On the inner side a bristle. The telopodite is a moderately broad leaf seen from the side, and narrow seen from behind, with several strong bristles ; on the inner side a slender, pointed lobe (*i*) is detached. The seminal duct (*sd*), whose beginning is the same as in the related species, opens in a cup with weak, finely striated walls. The posterior gonopods are slightly bent outwards from the middle ; the tooth on the outer side is strong but blunt ; no tooth on the inner side, but several strong bristles (figs. 256-258).

Brand Vlei, Worcester Div. (1692), Cape.

179. (10) *Julomorpha cicur* n. sp.

(Pl. X, figs. 247-250.)

♂, 51-55 segments ; width 1.5 mm. Black.

Deepened margin of anal valves not bordered. Coxite of anterior gonopod broad, rounded, and obliquely truncated. Telopodite divided into two branches by a deep sinus extending as far as the middle ; the median (*m*) one is simply rounded ; the seminal duct runs along its anterior surface ; it is strongly bristled. The lateral branch (*l*) bears on the outer side near the rounded tip a slender and pointed tooth (figs. 247 and 248). Posterior gonopods : the basal parts of the two gonopods are parallel and end in a rounded, hairy shoulder (*p*) ; the distal parts with the pads, etc., are directed somewhat obliquely and outwardly. The pad is long and narrow, the lateral tooth long ; no tooth on the inner side (figs. 249-250).

Caledon (14657), Cape.

180. (11) *Julomorpha rudis* n. sp.

(Pl. XI, figs. 272-274.)

♂, 54 segments; width 1.6 mm. Dark brown.

Margin of anal valves not bordered. Coxite of anterior gonopods (Co, figs. 272, 273) a broad, rounded plate, with a little lobe on the outer side at the tip. The telopodite also broad; from the outer margin a slightly curved 2-pointed branch is detached; on the inner side are two rows of bristles (fig. 272). Posterior gonopods divergent from the middle; the lateral tooth does not surpass the pad. No tooth on the inner side (fig. 274).

Swellendam (7653), Cape.

2. Subgen. HYPOCHLORELLA nov.

The posterior gonopods have no median prominent pad, but are hollowed out like a little cup. The body is not pigmented but pale. The eyes are few, and arranged in a triangle. All other characters are the same as in the subgenus *Julomorpha*.

181. *Julomorpha (Hypochlorella) pallida* n. sp.

(Pl. XX, figs. 495-497.)

Colour whitish or pale yellow (the original colour probably a little altered by the alcohol), the eyes dark brown. ♂, 55 segments; width 1.4 mm.; long and slender.

Labral sinus shallow; three distinct but short and blunt teeth. Antennae of medium size, moderately incrassate; 12 ocelli arranged in a triangle, the point of the triangle directed forwards, the rows a little irregular. Cheeks of the ♂ quadrate, the angles rounded, the borders thickened. Metasomites hairless, very smooth and shiny, longitudinally striated on the ventral side, the furrows spaced and regular. Pores beginning on the sixth segment. Dorsal margin of the anal segment evenly truncate; anal valves without marginal thickening; with two bristles. The first pairs of legs 5-jointed, the second joint with a rounded lobe; the shape of the whole leg like that of *J. kinbergi* Por.

Gonopods: the sternite is a broad, strong plate, completely fused with the tracheal stalks. The anterior gonopods (figs. 495, 496) are 2-jointed. The coxite with a long process, surpassing the telopodite a little. The process has the shape of a boat, the bow turned upwards

or to the aboral side in the natural position of rest. Near the base are some bristles. The telopodite is broad basally and has the same round cavity as in *Julomorpha*, but the margins of this cavity are not beset with fringes. The distal part is narrowed and beset with small spines. The tip is rounded. The posterior gonopods (fig. 497) are 1-jointed little stumps, the tip hollowed out, cup-like; the internal wall is beset with some long bristles, the lateral wall forms a pointed prominence.

River Zonder End, one ♂ (B. 5266), Cape.

Sub-suborder SPIROSTREPTOIDEAE Cook.

1895. Suborder *Spirostreptoidea* Cook, Ann. N. York Ac. Sci., ix, p. 5.

1896. Fam. *Spirostreptidae* Silvestri, I Diplopodi, p. 54.

1909. Fam. *Spirostreptidae* Pocock, Biol. Centr. Amer., p. 90.

1914. Order *Spirostreptoidea* Attems, Afrikan. Spirostr., Chun, Bibl. Zool., Hefte 65, 66.

1914. Order *Spirostreptoidea* Attems, Indo-Austral. Myr., p. 287.

1926. Sub-suborder *Spirostreptoideae* Attems, Kükenthal's Handb. d. Zool., iv, p. 197.

Gnathochilarium with large duplomentum, separating the lamellae linguales only for a short distance basally, the lamellae being contiguous for the largest part of their median borders. Praebasilare not divided. The stipites narrowed in their basal part and reaching up to the posterior margin of the duplomentum, thus surrounding the latter laterally. The gonopods consisting in the first pair of appendages of the seventh segment, the second pair of appendages of this segment wanting completely (*Spirostreptidea*) or only the sternite present (*Odontopygidea*). The telopodite of the gonopods included in a tube formed by the coxa. The prostate (coxal) gland opens in the coxa on the "stylet prostatique" (Brölemann), and the secretion is conducted further by a canal in the telopodite, the prostate canal. The sternite of the gonopods is always present. The postfemur and tibia of the male legs generally padded, the tarsus never padded. The sides of the collum of the ♂ generally modified, enlarged, the angles lobed. The first pair of legs of the ♂ not modified, equal to the second pair. The coxae of the anterior legs without special apophyses. Transverse suture generally well developed.

We are greatly indebted to Brölemann, who, by his discoveries, has largely advanced our knowledge of the gonopods of the Spirostreptids.

He studied the development of the gonopods in different stages and proved that only the first pair of appendages of the seventh segment becomes the gonopods, whilst the buds of the second pair of appendages, present in very young stages, disappear gradually in the course of development. In the *Spirostreptidea* this pair disappears completely, also the sternite; in the *Odontopygidea* the sternite remains.

The first paper of Brölemann (1916) on this subject was not a full proof of his views, because the question of the opening of the coxal or prostate gland was not settled. He believed that this gland opened in the long slender cylinder included in the tube, and this cylinder is now recognised as the praefemur, the basal part of the telopodite. Now, the supposition that the duct opened in the telopodite, omitting the coxa, was inadmissible. Brölemann solved this difficulty and proved that the gland opens not directly in the telopodite, but in the wall of the tube or in the coxa by a protuberance, called by him "stylet prostatique," and that the point of this protuberance only is inserted in the base of the canal contained in the telopodite, the prostate canal. Brölemann calls this canal "rainure seminale" (e.g. *Afrique Orientale*, p. 80) a confused terminology with which I cannot agree. The term sperm canal (Samenrinne) was introduced by me for the canal in the telopodite of the *Polydesmoidea*, which has nothing to do with the coxal (prostate) gland, not existing in the Polydesmids. This canal in the Polydesmids really conducts the sperm from the large basal groove receiving the sperm out of the genital opening, to the apex of the tibial process or to the sperm vesicle. The canal in the telopodite of the Julid gonopods is quite another thing; it conducts the secretion of the coxal (prostate) gland and not the sperm, and cannot be called sperm canal.

The discovery of Brölemann necessitates a new nomenclature of the parts of the gonopods. The former "anterior gonopod" is now the coxite, and the former "posterior gonopod" is now the telopodite. In the telopodite of the suborder *Spirostreptidea* we cannot distinguish a clear segmentation; in the *Odontopygidea*, on the contrary, we can distinguish four segments. Brölemann* gives the homology of these segments. I propose a slight change, namely, to call the long slender part contained in the sheath of the coxite praefemur; the division between the praefemur and femur is clear only in the *Odontopygidea*. The femur generally bears a long spine or a broad

* Brölemann, Myriapodes in: Voyage de Ch. Alluaud et R. Jeannel en Afrique Orientale, 1920.

lappet in both suborders. The femur and the tibia of the *Odontopygidea* are separated by a constriction. The tibia consists of a short trunk bearing a long process, the tibial process, with the prostate canal; besides this the tibia bears the well-developed tarsus. It seems that in the *Spirostreptidea* the whole terminal part with the prostate canal is homologous only with the tibia and tibial process of the *Odontopygidea*. Only in a few species do we see a little lateral arm or lappet near the tip, probably homologous with the tarsus.

The distribution of the *Spirostreptoidea* is very interesting, and demonstrates the close relationship between Africa and South America, a number of genera and subgenera being common to both countries. The development was probably as follows: in the Antarctic continent forms first arose similar to the family *Spirostreptidae* and came from this continent to Africa and to South America. In Africa the *Harpagophoridae* arose and attained the Indo-Australian Region by the Indo-Madagascar bridge, where several genera took form. After the abolition of the connections between India and Africa and South America and Africa the *Odontopygidea* arose in Africa. They did not get further than Madagascar. The presence of one species of *Trachystreptini* in the Carolines (Indo-Australian Region) must be re-examined, this genus being somewhat dubious. From the Ethiopian Region few species reached the Mediterranean subregion.

The following tabular view (p. 325) demonstrates the distribution. The genera represented in South Africa are in italics.

Superfam. SPIROSTREPTIDAE Attems.

1909. Attems, Schultze's Forsch. Reise, p. 9.

1914. Attems, Afrikan. Spirostrept., p. 52.

1926. Superfam. *Spirostreptidae* Attems, Kükenthal's Handb. d. Zool., iv, p. 198.

First sternite of seventh somite of the ♂ developed, second not present. Telopodites of the gonopods bent outwards (laterally) when leaving the canal of the coxite. Femoral spine often present. Telopodite of gonopod simpler than in the *Odontopygidea*, the tarsus generally completely wanting. Posterior margin of the metasomites without fringes. Praebasilare equal in both sexes. Mentum generally not hollowed out. Anal valves without dorsal spines.

DISTRIBUTION OF THE GENERA AND HIGHER GROUPS OF
SPIROSTREPTOIDEA.

	Morocco, Syria.	Ethiopian Region.		South America.	Indo- Austral. Region.
		Africa.	Mada- gascar.		
Suborder Spirostreptidea .					
1. Fam. Spirostreptidae .					
1. Subfam. Spirostreptinae .					
1. Tribe Spirostreptini .					
1. Genus <i>Spirostreptus</i> .	..	+	+	+	
Subgen. <i>Spirostreptus</i> .	..	+	+	+	
Subgen. <i>Macrolenostreptus</i> .	..	+	+		
Subgen. <i>Epistreptus</i> .	..	..	..	+	
Subgen. <i>Cladostreptus</i> .	..	..	..	+	
2. Gen. <i>Scaphiostreptus</i> .	..	+	+	+	
Subgen. <i>Scaphiostreptus</i> .	..	+	+	+	
Subgen. <i>Odontostreptus</i> .	..	+	+		
3. Gen. <i>Charactopygus</i> .	+	+	+		
4. Gen. <i>Doratogonus</i> .	..	+	+		
Subgen. <i>Doratogonus</i> .	..	+			
Subgen. <i>Otostreptus</i> .	..	+	+		
5. Gen. <i>Alloporus</i> .	..	+	+	+	
6. Gen. <i>Plusiopor</i> .	..	+	..	+	
7. Gen. <i>Ophistreptus</i> .	..	+			
8. Gen. <i>Pemptoporus</i> .	..	..	..	+	
9. Gen. <i>Autostreptus</i> .	..	..	..	+	
10. Gen. <i>Metriostreptus</i> .	..	+			
11. Gen. <i>Urotropis</i> .	..	+	..	+	
12. Gen. <i>Obelostreptus</i> .	..	+			
13. Gen. <i>Bicoxidens</i> .	..	+			
14. Gen. <i>Synophryostreptus</i> .	..	+			
15. Gen. <i>Camarico proctus</i> .	..	+			
16. Gen. <i>Globanus</i> .	..	+			
17. Gen. <i>Karīnikus</i> .	..	+			
18. Gen. <i>Aulonopygus</i> .	..	+			
19. Gen. <i>Gymnostreptus</i> .	..	+	+	+	
Subgen. <i>Gymnostreptus</i> .	..	..	..	+	
Subgen. <i>Orthoporus</i> .	..	+	+	+	
Subgen. <i>Diaporus</i> .	..	..	..	+	
20. Gen. <i>Mardonius</i> .	..	+	+		
21. Gen. <i>Eumekius</i> .	..	+	+		
22. Gen. <i>Nanostreptus</i> .	..	..	..	+	
23. Gen. <i>Stenostreptus</i> .	..	..	..	+	
24. Gen. <i>Trichogonostreptus</i> .	..	..	..	+	
2. Tribe <i>Trachystreptini</i> .	..	+	..	..	*
2. Subfam. <i>Triænostreptinae</i> .	..	+			
2. Fam. <i>Harpagophoridae</i> .	..	+	..	..	+
Gen. <i>Harpagophora</i> .	..	+			
Gen. <i>Poratophilus</i> .	..	+			
Gen. <i>Thyropygus</i> .	..	+	+	..	+
Gen. <i>Ktenostreptus</i> .	..	..	..	..	+
Gen. <i>Rhynchoproctus</i> .	..	..	..	..	+
Gen. <i>Eremobelus</i> .	..	..	..	..	+
Gen. <i>Anurostreptus</i> .	..	..	..	..	+
Gen. <i>Phyllogonostreptus</i> .	..	..	..	..	+
Gen. <i>Stenurostreptus</i> .	..	..	..	..	+
Suborder <i>Odontopygidea</i> .	..	+			

* One doubtful species in the Carolines.

1. Fam. SPIROSTREPTIDAE Attems.

1909. Attems, Zool. Anz., xxxiv, p. 156.

1909. Attems, Sjöstedt's Kilimandjaro-Meru Exped., p. 35.

1909. Attems, Schultze's Forsch. Reise, p. 40.

1914. Attems, Afrikan. Spirostrept., p. 53.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 198.

The gonocoel opens on the oral or median side; the lateral leaf of the gonopod-coxite lies for its whole length in front of the median (on its oral side). The telopodite of the gonopod occasionally ending in a plate, but this plate never spinose. Anal segment without prominent tail. Collum with one or more strong, curved folds.

1. Subfam. SPIROSTREPTINAE Attems.

1914. Attems, Afrikan. Spirostrept., p. 53.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 198.

The prostate duct in the gonopod is not forked, but opens simply at the tip of the gonopod. The median leaf of the coxite of the gonopod is bent outwards only at its base, and this collar tapers gradually.

1. Tribe *Spirostreptini* Attems.

1909. Subfam. *Spirostreptinae* Attems, Zool. Anz., xxxiv, p. 157.

1909. Subfam. *Spirostreptinae* Attems, Schultze's Forsch. Reise, p. 40.

1914. Tribe *Spirostreptini* Attems, Afrikan. Spirostrept., p. 54.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 198.

Metasomites smooth or weakly sculptured, never strongly keeled. Diameter of prosomites and metasomites equal or changing but little and gradually.

Key to the Genera of Spirostreptini.

- 1a. Gonopods with one or two femoral spines 2.
- 2a. Foramina repugnatoria beginning from the sixth segment 3.
- 3a. Femoral spine rising distally to the femoral knee (*Metriostreptus* has four little spines besides the femoral spine) 4.
- 4a. The femorite of gonopods bears two little spines in front of, and two spines on the knee; the femoral spine distal to the knee. Prosomites without ringed lines; border of anal valves without margination and furrow

Metriostreptus Silv.

- 4b. Two spines or lobes on the extremity of the femur of the gonopod. On the knee no spine. Border of anal valves separated by a small furrow from the margination. Prosomites with ringed lines . . . *Bicocidens* nov. gen.
- 4c. The gonopod femur bears only one spine at some distance from the knee and from the passage in the telopodite. Prosomites generally with ringed lines 5.
- 5a. Border of anal valves separated by a small furrow from the thick margination
Charactopygus S. and Z.
- 5b. Margination of both anal valves, if present, immediately contiguous . . . 6.
- 6a. Telopodite of gonopods slender and cylindrical, and bearing a lateral spine
Doratogonus Att. 7.
- 7a. Lobe of collum of ♂ broad and triangular; femoral spine strongly curved and nearly as long as the telopodite . . . subgen. *Doratogonus* Att.
- 7b. Collum with long rod-like process; femoral spine short, nearly straight
subgen. *Otostreptus* Att.
- 6b. Telopodite of gonopods without lateral spine, slender or with broad lamellar rims 8.
- 8a. Telopodite of gonopods slender, attenuated distally, without lamellar rims or with only very narrow borders, not forming a terminal plate
Spirostreptus Brandt-Attems.
- 8b. Telopodite of gonopod with more or less broad rims, forming a terminal plate; the slender canal branch rises out of this plate . . . *Scaphiostreptus* Bröl.
- 3b. Femoral spine rising from the knee or just before the knee . . . 9.
- 9a. Median half of lateral lamellae of gonopod-coxite covered with hairs to the base. Extremity of gonopod-coxite cap-like and turned inwards. Extremity of gonopod simple, not divided . . . *Stenostreptus* Carl.
- 9b. Lateral lamellae of gonopod-coxite covered with hairs only in distal part. Extremity of gonopod-coxite turned outwards and not cap-like. Gonopod telopodite with a lateral branch or lamella 10.
- 10a. Anal segment with a median keel *Urotropis* Silv.
- 10b. Anal segment without a median keel 11.
- 11a. Femoral spine in the same axis as the basal part of the femur, remote from the telopodite. On the extremity of the femur of the gonopod a large plate and a curved spine; telopodite with very broad lamellar rims; gonopod-coxite without lateral cones *Obelostreptus* Att.
- 11b. Femoral spine parallel to the femur; telopodite cylindrical, without or with very narrow rims 12.
- 12a. Anal valves without margination; transverse suture obsolete dorsally. Fourth joint of legs padded; fifth joint not padded. The femoral spine rising from the outer side of the curve *Globanus* Att.
- 12b. Anal valves with margination. Transverse suture dorsally distinct. Fourth and fifth joints of the legs padded 13.
- 13a. Margination of anal valves not separated by a furrow from the border. Femoral spine rising from the anterior side, not from the outer side of the curve (at the beginning of the telopodite a little acute spine)
Synophryostreptus nov. gen.
- 13b. Margination of anal valves separated by a small furrow from the border. Femoral spine rising from the outer side of the curve 14.

- 14a. No spine or lobe on the extremity of the femur. Lateral leaf of the gonopod-coxite simply rounded. Metasomites with yellow punctures
Kartinikus Att.
- 14b. At the extremity of the femur a strong spine. Lateral leaf of gonopod-coxite with a long spine at the extremity. Yellow punctures of metasomites not visible *Aulonopygus* Att.
- 2b. Foramina repugnatoria beginning at the fifth segment 15.
- 15a. Praebasilare of ♂ only laterally chitinised, the remaining part membranous. Only the fifth joint of legs padded *Autostreptus* Silv.
- 15b. Praebasilare wholly chitinised. Fourth and fifth joints of legs padded . 16.
- 16a. Telopodite of gonopod with long lateral fringes in the distal half
Trichogonostreptus Carl.
- 16b. Telopodite without lateral fringes 17.
- 17a. Telopodite of gonopods with broad lamellar rims 18.
- 18a. Femoral spine very long, nearly as long as the telopodite and parallel to it (South America) *Pemptoporus* Att.
- 18b. Femoral spine short 19.
- 19a. Femoral spine commencing distally to the knee. Anal valves with thickened border 20.
- 20a. Femoral spine straight. The tip of the lateral lamella of the coxite is a straight, bristled cone. The tip of the telopodite has lamellar rims but it is not trowel-shaped. *Nesostreptus* Att.
- 20b. Femoral spine curved round the telopodite. The tip of lateral lamella is rounded, not bristled. The tip of the telopodite is trowel-shaped, the slender channel-branch rising out of this trowel . . . *Ophistreptus* Silv.
- 19b. Femoral spine commencing in front of the knee, and directed in the same direction as the praefemur. Anal valves wholly without thickening
Camaricoproctus nov. gen.
- 17b. Telopodite of gonopod slender, without or with small lamellar rims throughout a part of its length, the rest cylindrical 21.
- 21a. Telopodite of gonopods with a long lateral spine close to the extremity
Alloporus Por.
- 21b. Telopodite without lateral spine. *Plusioporus* Silv.
- 1b. Gonopods without femoral spine 22.
- 22a. Foramina repugnatoria beginning at the fifth segment (South America)
Gymnostreptus subgen. *Diaporus* Silv.
- 22b. Foramina repugnatoria beginning at the sixth segment 23.
- 23a. Median leaf of gonopod-coxite not very highly raised, nearly always with large lateral cones. Telopodite with broad lamellar borders along its whole length, or with a large spine or plate-like appendage 24.
- 24a. Telopodite slender, bearing a large spine or plate-like appendage (South America) *Gymnostreptus* subgen. *Gymnostreptus*.
- 24b. Telopodite through its whole length with broad lamellar rims (South America, Africa) *Gymnostreptus* subgen. *Orthoporus*.
- 23b. Median leaf of gonopod-coxite highly raised, without lateral cone. Telopodite of gonopod slender, without lateral spines, etc. 25.
- 25a. Femur of gonopods with a lobe or spine at end *Mardonius* Att.
- 25b. Femur without such an appendage *Eumekius* Att.

Gen. SPIROSTREPTUS Brandt.

1914. Attems, Afrikan. Spirostr., p. 56.

Subgen. SPIROSTREPTUS Att.

1914. Attems, *loc. cit.*, p. 56.

182. *Spirostreptus semilunaris* Pet.

1855. *Spirostreptus semilunaris* Peters, Mon. Ber. Ak. Berlin, p. 76.

1862. *Spirostreptus semilunaris* Peters, Naturw. Reise Mossambique, p. 541, pl. xxxiv, fig. 4.

1896. *Spirostreptus macrotis* Attems, Stuhlmann's Reise, p. 27, fig. 9.

1914. *Spirostreptus semilunaris* Attems, Afrikan. Spirostr., p. 59.

Mozambique, South of Zambesi; Tette, Rios di Sena; Mozambique, North of Zambesi; Quilimane, East Africa.

Gen. BICOXIDENS nov.

At the extremity of the femur of the gonopod just before the curve of the canal two spines or lobes. Telopodite slender, cylindrical, without large lateral spines; just in front of the apex a rounded lobe. Medial leaf of gonopod-coxite with a thick rounded lobe instead of the lateral cone and with an inwardly directed lobe. Lateral leaf with an area of bristles. Foramina repugnatoria beginning on the sixth segment. Anal valves with a thick margination, separated from the internal border by a furrow as in *Charactopygus*. Scale bent, flat. Collum without anterior lobe, with two or three curved folds. Prosomite with the usual ringed lines. Metasomites ventrally striated as usual. The yellow pits in 2-3 transverse rows. Suture well developed. Legs of anterior and middle region with two pads. Four supralabral pits. Stigma triangular, the outer border in the same line as outer border of sternite.

The two species are separable by the following characters:—

Body black. Two spines on the femur of the gonopod. The inwardly directed lobe at the extremity of the gonopod-coxite is short, rounded, and not crossed by the lobe of the opposite side	<i>B. nigerrimus</i> .
Prosomites yellowish, metasomites blackish-brown, collum and dorsum of the anterior 6-7 segments yellow. Femur of the gonopod with a spine and a lobe. The lobe of the gonopod-coxite is very long and slender and crosses the lobe of the opposite gonopod	<i>B. flavicollis</i> n. sp.

183. *Bicoxidens nigerrimus* n. sp.

(Pl. XI, figs. 279-281.)

Colour black, legs and antennae deep reddish-brown or yellowish-brown. ♂ and ♀, 55 segments; width 7.8 to 8.4 mm.

Labral sinus moderately deep; four supralabral pits. Anterior part of clypeus wrinkled. Interocular line scarcely visible. Vertex line very shallow. Interior angle of eyes extending a little further inwards than the antennae; the single ocellus distinctly convex. Collum of ♂ practically without anterior lobe, the anterior angles widely rounded. Two complete and one abbreviated fold next to the furrow defining the border. Ringed lines of prosomite numerous and regular. Longitudinal striation of metasomites somewhat irregular and very fine, extending on the anterior segments up to the foramen; gradually further removed from the foramen on the following segments. Suture well developed. Foramina at the junction of anterior and middle third, the suture in front of them scarcely bent. Visible part of prosomite and the whole metasomite dulled by a fine, very dense punctuation. The yellow punctures in three rows. Dorsal border of anal segment with a triangular bluntly keeled projection, the beginning of a caudal process. Valves with a high margination separated by a furrow from the internal border and accompanied by a deep groove on the external side. The scale flat, curved. The whole anal segment roughened by dense punctuation.

Sternites transversely striated in the middle, the borders soft, the stigma not surpassing the border of the sternite. Fourth and fifth joints of legs (with the exception of the last 14 or 15) with large pads. Gonopods: the medial leaf bears instead of the lateral cones (fig. 281) a thick rounded process passing inwards in the form of a more slender lobe; on the aboral side (fig. 280) a similar lobe separated by a sinus from the first, and a third rounded short lobe on the external side. The lateral leaf (*Al*) is densely bristled. In the middle of the lateral border a large rounded lobe. The femur of the gonopod (figs. 279, 281) bears two teeth just before the curvature of the canal. The whole telopodite is slender and cylindrical and bears a little lobe before the extremity.

Salisbury (B. 3351); Bulawayo (3361), S. Rhodesia.

184. *Bicoxidens flavicollis* n. sp.

(Pl. XI, figs. 275-278.)

Colour: head-plate greenish-black, antennae blackish, collar and dorsum of the first 6-7 segments yellow, the posterior border of these segments blackish. Metasomites and legs blackish-brown. Anal segment yellowish, only the prominence of dorsal border dark brown. ♂, 56 segments; width 6.7 to 7 mm.

Labral sinus shallow; four supralabral pits, somewhat indistinct on account of rough wrinkles. The whole head-plate with very dense and fine pits. Interocular line not visible. Vertex line very shallow. The internal ocular angle situated only a little further inwards than the base of the antennae; the single ocellus distinctly convex. Collum without anterior lobe; anterior border forming a regular arch with lateral border. Besides the border furrow there are three curved folds. Ringed lines of prosomites running regularly round the segment. Longitudinal striae of metasomites somewhat irregular, sometimes oblique and intermixed with shorter ones. They extend almost to the foramen. The foramen lies nearly in the suture on the sixth segment; on the following segments it becomes gradually more distant and is situated nearly in the middle of the metasomite in the hinder segments. The yellow pits in two regular rows. The dorsal border of the anal segment forms a blunt angle, and in the middle of this angle, not projecting beyond the anal valves, is a short, blunt hook, the beginning of a caudal process. The valves have a margination accompanied laterally by a deep groove and internally by a furrow separating them from the border. The anal scale with a blunt angle. Sternites with a fine irregular sculpture. Stigma not passing beyond the lateral border of sternite.

The anterior legs with a very small pad on the fourth and a larger pad on the fifth joint. They stop a few segments behind the copulatory one. Gonopods: the coxite of the gonopods is distinguished by a long, slender, oblique, backwardly and inwardly directed lobe crossing the lobe of the opposite gonopod. They are distinctly visible only from the aboral side (fig. 277) and appear completely transverse in the drawing, while in reality they are oblique. We find besides on the inside and outside a thick, rounded lobe. The lateral leaf (*Al*) bears a blunt hatchet-like process on the inside. The field of bristles extends from the outer border beyond the middle (fig. 275). Telopodite of the gonopods (fig. 276): immediately before the curve in the canal rises a thick conical spine (*Cd*) on the internal side and a little rounded lobe (*Cl*), distal to this point; the telopodite is slender and cylindrical, and becomes tape-like only towards the extremity, which bears a rounded lateral lobe (fig. 278).

Umtali (13743), S. Rhodesia.

Gen. DORATOGONUS Attems.

1914. Attems, Afrikan. Spirostr., p. 105.

Femoral spine of gonopod moderately long (subgen. *Otostreptus*),

or very long (subgen. *Doratogonus*), and strongly curved or twisted into a spiral, rising some distance from the knee. A femoral lobe usually present. Telopodite long and slender, with a spine before the tip (characteristic of this genus). Lateral leaf of gonopod sometimes with a terminal claw, far surpassing the median leaf. Lateral cone present or wanting. Pores beginning on the sixth segment. Anterior angle of collum of ♂ with a lobe, which reaches its highest development in the subgen. *Otostreptus*. Prosomites with concentric furrows, extending as far as the sternite, except in *D. multiannulatus*, where there are short irregular striae. Metasomites smooth or finely punctate. Transverse suture visible round the whole segment. Yellow pits in one row, rarely in more than one. Foramina repugnatoria beginning on the sixth segment. The legs are padded from the third to the last pair. Four or (in *D. styliifer*) two supralabral pits. The stigma do not surpass the lateral margin of the sternite.

East and South Africa, Madagascar.

1. Subgen. DORATOgonus Attems.

1914. Attems, Afrikan. Spirostr., p. 106.

Labral sinus shallow or moderately deep; four supralabral pits. Clypeus with fine and dense punctuation, in the fore part with shallow wrinkles or short longitudinal furrows as well. Inner angle of the eye surpassing base of antennae, the distance between the eyes greater than diameter of an eye. Interocular and vertex line very weak. Collum with lobe in the anterior angle, the sides of which are convergent or nearly parallel; 2-3 curved folds.

Prosomites: the concentric furrows on the ventral surface of the seventh segment of the ♂ are somewhat irregular, passing obliquely to the transverse suture. In *D. setosus*, and *setosus uncinatus*, they are straight in this segment also. Free part of prosomite densely punctured, the punctures mostly continued upon the fore part and sometimes on the whole of the metasomite; the yellow pits in a single or in several (two or more) irregular rows. Sternites smooth or with fine transverse striae. Dorsal margin of anal segment rounded or bluntly angular. The marginal thickening of the valves fairly high, not accompanied on the outer side by a groove. The inner margin without a furrow.

Gonopods: the tip of the gonopod-coxite is oblique or lobate and more or less prominent; the long slender cone or the short thick

knob (if no lateral cone) bear usually an inwardly curved hook. The lateral leaf generally bears a long claw, far surpassing the medial leaf; the oral surface is covered with hairs; on the inner margin a blunt process in *D. flavifilis* and *capricornis* similar to that of many species of *Alloporus*. Telopodite of the gonopod with a long femoral spine rising far from the knee, strongly curved, describing a whole circle or more, the middle mostly enlarged. Telopodite generally slender and cylindrical; in the first half often with a narrow lamella, the end rounded or with two hooks; before the tip a large slender lateral spine.

Distribution.—South Africa, Mozambique, Central African Lakes.

Synopsis of the Subgen. Doratogonus.

- 1a. Lateral leaf of gonopod-coxite with a pronged process on the inner side. The yellow punctures of the metasomite arranged in a single row . . . 2.
- 2a. Lateral leaf of gonopod-coxite terminated by a short triangular lobe or a short straight tooth surpassed by the median leaf. No lateral cone and no hook on outer side . . . (1) *flavifilis* (Pet.).
- 2b. Lateral leaf terminated by a horn bent outwards and surpassing the median leaf. A long lateral cone with a hook present . . . (2) *capricornis* n. sp.
- 1b. Lateral leaf of gonopod-coxite without process on inner margin. Yellow punctures of metasomite in an irregular zone of several rows . . . 3.
- 3a. Gonopod-coxite with a long slender lateral cone without hook. The furrows on the concealed part of prosomite are short irregular striae
multiannulatus Carl.
- 3b. Gonopod-coxite without or with very short and thick lateral cones; in both cases with a black hook. Concentric furrows of prosomite normal . . . 4.
- 4a. Median leaf of gonopod-coxite obliquely truncate at end. The legs annulated, the joints being lighter . . . (3) *annulipes* Carl.
- 4b. Median leaf broadly rounded and convex . . . 5.
- 5a. Lateral leaf of gonopod-coxite covered with hairs only in outer half. Terminal claw of lateral leaf exceeded by the long, rounded lamella of the median leaf. Concentric furrows of seventh segment of ♂ irregular, meeting the transverse suture. Lateral lamella on telopodite of gonopod rounded. Legs yellow . . . (4) *xanthopus* n. sp.
- 5b. Lateral leaf of gonopod-coxite covered with hairs from outer to inner margin, terminal claw also partly hairy, and exceeding the rounded terminal margin of median leaf. Concentric furrows of seventh segment of ♂ regular, not meeting the transverse suture. Legs brown; the joints yellow . . . 6.
- 6a. The lateral lamella of the telopodite of the gonopod is rounded. The terminal claw of the lateral leaf is straight and bears some hairs at its base
(5) *setosus* (Vog.).
- 6b. The lateral lamella of the telopodite is terminated by a curved tooth. The terminal claw of the lateral leaf is twisted more than the basal half, and is hairy . . . (6) *setosus uncinatus* n. subsp.

185. (1) *Doratogonus flavifilis* (Pet.).1855. *Spirostreptus flavifilis* Peters, Mon. Ber. Ak. Wiss. Berlin, p. 77.1862. *Spirostreptus flavifilis* Peters, Naturw. Reise Mossamb., p. 539.1914. *Doratogonus flavifilis* Attems, Afrikan. Spirostr., p. 108, pl. iv, figs. 88-89 ; pl. v, fig. 95.

(Pl. XI, fig. 285.)

Metasomites black or blackish-brown. The posterior margin reddish-brown. Prosomites yellowish in the concealed part. Antennae and legs yellow or reddish-brown. ♂, 62-63 segments ; width 3-10 mm.

Labral sinus shallow and narrow. Four supralabral pits. Clypeus with dense punctuation and short, shallow furrows. Frons and vertex rough, but without distinct sculpture. Cheeks of ♂ with large broadly rounded lobe. Collum of ♂ : the anterior angle forms a little, rounded, forwardly directed lobe, the lateral margin oblique, the marginal furrow not interrupted at the lobe in the anterior angle. Two curved folds. In the female the anterior angle is a right angle without lobe. Prosomites with numerous punctate concentric furrows, passing straight as far as the sternite, the spaces between them increasing gradually, the last space equal to two preceding spaces and densely covered with fine and shallow pits, similar to the whole metasomite. The yellow pits are small and arranged in a single row. Pores somewhat in front of the middle ; one specimen from Masiene had one pore on the left side on the 5th segment. The longitudinal furrows of the metasomite not reaching the pore. Dorsal margin of the anal segment flatly convex, not angled. The border of the anal valves relatively low and narrow. Sternites smooth, all legs padded, the pads of the last pairs very small.

Gonopods : sternite V-shaped, with rounded apex ; internal margin of medial leaf straight as far as the middle, then deeply sinuate ; broadly rounded on the inner side and bearing a little tooth on the outer side. On the lateral leaf two lobes, the one right-angled, the second triangular ; the tip densely covered with hairs and broadly rounded (fig. 285). The coxal spine of the gonopod rises far from the knee, is very large, the first two-thirds being straight, then enlarged and hooked. The telepodite is broad ; the tip a short, straight spine, the tip is hooked with a little protuberance.

Umtali, S. Rhodesia (13741) ; Mozambique (1615) ; Masiene, Chai Chai, Portuguese E. Africa (B. 6018) ; Mozambique Island, Cabaceira Peninsula (Pet.).

185a. *Doratogonus flavifilis armatus* n. subsp.

1914. *Doratogonus flavifilis* p. p. Attems, Afrikan. Spirostr., pl. iv, fig. 87.

Differing from *D. flavifilis* by having a pointed, straight tooth on the internal angle of the lateral leaf of the gonopod-coxite.

Nyangao, East Africa.

When describing *D. flavifilis* in the Afrikan. Spirostreptiden I doubted whether the absence of this tooth in the specimens from Mozambique and its presence in the specimens from East Africa was constant. Now, after having seen more examples from Mozambique and Portuguese East Africa, all lacking this tooth, I believe that the specimens from Nyangao must be a distinct subspecies. The typical specimens of *D. flavifilis* Peters originated from Mozambique.

186. (2) *Doratogonus capricornis* n. sp.

(Pl. XI, figs. 282-284.)

Head, antennae, collum, and part of the dorsum of the first 3-4 segments and the prosomites dark reddish-brown. Metasomites largest, black. ♂, 57-58 segments; width 8.5-9.5 mm.

Labral sinus shallow. Four supralabral pits. Clypeus moderately wrinkled and densely punctate. The inner angle of the eye slender and pointed, surpassing the base of the antennae; the ocelli, especially the inner ones, flattened. The distance between the eyes greater than the diameter of one eye. Interocular line very weak, vertex line very fine, both meeting in a little pit. The lobe of the collum narrowed and rounded, two complete and one abbreviated fold besides the marginal furrows. The concentric furrows of the prosomite numerous, straight, or sometimes anastomosing. On the seventh segment of the ♂ they are bent backwards on the ventral surface, meeting the transverse suture. Visible part of the prosomite and anterior half of the metasomite with fine and dense punctuation and wrinkles. The posterior half of the metasomite smooth; the very fine punctuation visible only under the microscope. Pores before the middle. Yellow pits in a single regular row. Longitudinal furrows of metasomite, as usual, not reaching the pore. Sternites with very fine and shallow transverse striae.

Dorsal margin of the anal segment with blunt angle, separated by two transverse folds. The valves strongly raised, the thickening of the margin moderately high, not accompanied by a groove on the

outer side. The whole anal segment densely punctate. All the legs except the first padded. Gonopods: gonopod-coxite with long and slender lateral hooked cone (fig. 283). The lateral leaf (*Al*) ends with a long, slender, outwardly curved hook far surpassing the medial leaf; under this hook on the inner side is a toothed process similar to that of *D. flavifilis* and most species of *Alloporus*. The flat surface between this prominence and the rounded swelling bounding it on the lateral side is covered with hairs. The femoral spine (fig. 284 *Cd*) of the gonopod describes a circle, is enlarged and band-like in the middle. The tip is not hooked. The femoral lobe short. The telopodite is slender, cylindrical; the enlargement weakly indicated at the beginning; the tip is forked in the same manner as in all allied species.

Krugersdorp, Transvaal (A. 23403).

187. (3) *Doratogonus annulipes* Carl.

1917. *Doratogonus annulipes* Carl, Spirostr. Nouv., Rev. Suisse Zool., xxv, p. 402.

(Pl. XII, fig. 289.)

Colour brown or black, concealed part of metasomite yellowish or reddish. Clypeus reddish-brown, lighter than the dorsum. Antennae reddish-brown or annulated, the articulations lighter. Anal valves black or yellowish. Legs reddish-brown. ♂, 60–64 segments; width, in the fore part 7·8, in the middle 9 mm.

Labral sinus moderately deep; four or five supralabral pits. Clypeus weakly wrinkled. Eyes and furrows of the head as in *D. setosus*. Lobes in the anterior angles of the collum broadly truncate, the sides convergent; two complete and one or two abbreviated curved furrows besides the fine marginal furrow. The sculpture of the segments like that of *D. setosus* with the following differences: the longitudinal furrows of the metasomite are weaker and not so regular, but mixed with abbreviated furrows. The concentric furrows of the seventh segment of the ♂ are irregular on the ventral surface and are bent backwards. Yellow pits in 2–3 irregular rows. The exposed part of the prosomite and the first strip of the metasomite slightly roughened, the rest of the metasomite very smooth.

Dorsal margin of anal segment with blunt, rounded angle. The thickening of the anal valves not high and not accompanied by a groove on the outer side, but rising abruptly. The legs are padded from the second to the last pair. The gonopod-coxite (fig. 289) is

obliquely truncate, sloping outwards and not rounded semicircularly as in *D. xanthopus* or *setosus*. Only the lateral half of the lateral leaf is covered with hairs; the terminal spine is long and straight, its base not pubescent. The lateral lamella of the telopodite is prominent, but rounded at the tip.

Cape Province.—Grahamstown (A. 23383), Pocaltsdorp (7394), De Aar (B. 941), Knysna Forest (1545, B. 2240, 1548), Hanover (A. 2325), George (6387), Montagu (B. 4167), Graaff-Reinet (1666), Cookhouse (B. 928), East London (A. 23389), Hageraars Kraal, Victoria West Div. (7507).

188. (4) *Doratogonus xanthopus* n. sp.

(Pl. XI, fig. 286; Pl. XII, figs. 287–288.)

Colour black; concealed part of prosomite yellowish-brown. Antennae and legs yellowish-brown, the latter not lighter at the joints but unicoloured. Clypeus dark reddish-brown. ♂, 68 segments; width 8.8–9.2 mm.

Clypeus finely punctate, the longitudinal wrinkles weak; four supralabral pits. The ocelli distinctly convex. Vertex smooth. Interocular and vertex line, relation of eyes to antennae, etc., as usual. Lobe on the anterior angle of the collum with convergent sides, rounded. Three complete and several abbreviated folds. Marginal furrow not interrupted on the lobe. Prosomite with about 12 concentric furrows. On the seventh segment of the ♂ they become irregular; on the ventral surface they do not meet the transverse suture. The last space nearly equal to two preceding spaces. Free part of prosomite and fore part of metasomite punctate, the rest of the metasomite smooth (under the microscope very fine punctuations are seen). Yellow pits in an irregular zone of more than one row. The dorsal margin of the anal segment is a blunt triangle, marked by a slight transverse notch at its base. The marginal thickening of the valves moderately high. Scale raised. Sternites very finely striated transversely. Legs padded from the third to the last pair.

Gonopods: the medial leaf is terminated by a rounded lamella, narrowed but longer than the lamella of *D. setosus*, surpassing by a little the claw of the lateral leaf, which is long, slender, weakly curved. The lateral leaf is covered with hair only on the lateral half (fig. 288). Telopodite: femoral spine long, cylindrical, not markedly enlarged anywhere, describing more than a complete circle. The telopodite bears a lateral lamella rounded at the tip (figs. 286, 287).

Port St. Johns, Cape (A. 23366).

189. (5) *Doratogonus setosus* (Vog.).

1878. *Spirostreptus setosus* Voges, Zeit. f. Wiss. Zool., xxxi, p. 105.

1914. *Doratogonus setosus* Attems, Afrikan. Spirostr., p. 107.

Blackish-brown, covered part of prosomites lead-grey, free part chestnut. Clypeus dark brown, the base of the joints of the antennae brownish, the rest black; legs yellowish.

♂, 60-67 segments. Width, in the fore part 7·3-9·7 mm., in the middle 8-11·2 mm.

Clypeus smooth or with very weak longitudinal wrinkles. Four supralabral pits. The lobe on the anterior angle of the collum is triangular or the sides are nearly parallel. Two complete and 0-2 abbreviated furrows. Concentric furrows of the prosomite passing direct to the sternite. On the seventh segment of the ♂ they do not bend to meet the suture, but remain parallel to the suture. Longitudinal furrows of the metasomite very regular and strong, no abbreviated furrows between them. The yellow punctures generally in one single row, rarely in a larger zone. The anal segment, sternites, pads of the legs as in *setosus uncinatus*.

Gonopods: sternite V-shaped; the medial margin of the medial leaf straight and not turned outwards. The tip is rounded and bears on the outer side a little pointed hook. Lateral leaf with a remarkably long, pointed, and curved spine or claw. The hairs cover the whole tip and part of the base of the terminal claw. The femoral spine of the gonopod, rising far from the knee, is very long, enlarged in the middle, pointed at the tip; it describes more than a complete circle. Femoral lobe large and rounded. Telopodite moderately thick and cylindrical, bearing a lateral rounded lamella. Below the tip a long, straight, pointed spine. The tip hooked without lateral lobe.

Umzimkulu (A. 23380), Port Shepstone (A. 23349), Durban (150178), Natal; Umtali, S. Rhodesia (13742). Port Natal (Voges).

190. (6) *Doratogonus setosus uncinatus* n. subsp.

(Pl. XII, figs. 290-292.)

Colour black or blackish-brown; covered part of prosomite yellowish. Antennae and anal segment blackish-brown. Colour of legs lighter at the articulations than on the rest of the joint, so that the legs are somewhat annulated as in *annulipes*, but not so distinctly.

♂, 61 segments; width, in the fore part 8·8 mm., in the middle 9·2 mm.

Four large supralabral pits. Clypeus longitudinally wrinkled, densely and very finely punctate. Between the antennae two little shallow pits. The eyes and the furrows on the vertex as in *D. setosus* type. The interior margin of the collum is straight as far as the inferior level of the head-plate, then it is bent forwards at an angle of 90° , so that a lobe with parallel sides is formed, directed forwards; two strong folds divided in front. Prosomite with numerous concentric furrows running straight to the sternite (on the seventh segment also), the space between the last furrow and the transverse suture not much larger than the preceding space; densely punctate. The fore part of the metasomite is also punctate; this punctuation gradually diminishes and the posterior part of the metasomite is very smooth. The pores open in front of the middle of the metasomite. The suture is slightly bent forwards in front of the pore. Regular longitudinal furrows distant from the pore. The yellow pits in two irregular rows. Sternites with very fine and shallow transverse striae in the middle. Dorsal margin of anal segment forming a blunt angle with rounded apex, separated by a shallow depression. The thickening of the valves stout and high. Anal scale bluntly triangular. Pads on the legs up to the last pair.

Gonopods: the medial leaf is rounded at the tip, and on the outer side bears instead of the lateral cone a little, pointed, black hook. The lateral leaf bears a spined, twisted, pointed process at the tip; the whole tip from the outer to the inner margin is densely covered with hairs; the hairs continued upon the distal process (figs. 290, 292). The femoral spine of the gonopod is long, describing more than a complete circle. The femoral lobe surrounds half the base of the following telopodite. On the outer margin of the telopodite a lamella with a curved, pointed spine. The tip is divided into the seminal branch and a pointed, slightly curved spine, characteristic of the genus (fig. 291).

In general appearance this subspecies cannot be distinguished from the typical form, but is easily recognisable by the spined process on the lateral leaf of the anterior gonopod.

Krantzkop (B. 3385), Howick (A. 23375), Rietvlei, Umvoti Distr. (7751), Natal.

2. Subgen. OTOSTREPTUS Att.

1914. Attems, Afrikan. Spirostrept., p. 106.

Anterior angle of collum of ♂ projecting in the form of a long, narrow, rod-like process. Femoral spine of gonopod short or

moderately long, much shorter than the telopodite, and straight or nearly so. Lateral leaf of the gonopod-coxite broadly rounded.

This subgenus, found in East Africa and Madagascar, is represented in South Africa only in Mozambique and by the following species.

191. (7) *Doratogonus styliifer* (Pet.).

1855. *Spirostreptus styliifer* Peters, Mon. Ber. Ak. Berlin, p. 78.

1862. *Spirostreptus styliifer* Peters, Naturw. Reise Mossambique, p. 542.

1873. *Spirostreptus macrotis* Gerstaecker, van der Deckens Reise, iii, p. 509.

1878. *Spirostreptus cephalotes* Voges, Zeitschr. Wiss. Zool., xxxi, p. 164.

1878. *Spirostreptus fasciatus* Voges, *ibid.*, p. 173.

1914. *Doratogonus styliifer* Attems, Afrikan. Spirostrept., p. 109. Mozambique, Matoudo-Rios de Sena, Zanzibar, Madagascar.

Gen. SCAPHIOSTREPTUS Bröl.

1902. *Spirostreptus* subgen. *Scaphiostreptus* Brölemann, Myr. Mus. Paulista, pp. 142, 150.

1914. *Scaphiostreptus* Attems, Afrikan. Spirostrept., p. 75.

Distribution.—The whole Ethiopian Region (Cameroon, Togoland, Central Africa, Zanzibar), Madagascar, Seychelles, Mauritius; South America (Colombia, Venezuela, Brazil).

1. Subgen. SCAPHIOSTREPTUS.

Lateral lamellae of the gonopod-coxite not toothed.

2. Subgen. ODONTOSTREPTUS.

Lateral lamellae of the anterior gonopod with one strong black tooth at or near to the tip.

The genus is represented in South Africa by a single species belonging to the first subgenus.

Key to the Species of the Subgenus *Scaphiostreptus*.*

- 1a. Prosomites without distinct encircling lines. *praepolitus* Attems.
- 1b. Prosomites with distinct encircling lines 2.
- 2a. The encircling lines becoming irregular on the ventral side, bent backwards ;
the suture vanishing ventrally *sjöstedti* Por.
- 2b. The encircling lines running straight to the sternite, not bent backwards. 3.
- 3a. The encircling lines diverging on the ventral side ; between them a trans-
verse groove. *intricatus* Voges.
- 3b. The encircling lines not diverging 4.
- 4a. Gonopod without lateral cone *macilentus* S. Z., *clunicalus* H. S.,
sulcaticollis Dad.
- 4b. Gonopod with lateral cone 5.
- 5a. Lateral cone hooked . *montanus* Att., *sulcicollis*, S. Z., *congoensis* Attems.
- 5b. Lateral cone straight, not hooked 6.
- 6a. Lateral cone very short, a broad, rounded lobe *coriaceus* S. Z.
- 6b. Lateral cone longer, conical 7.
- 7a. Margin of anal valves with deep impressions and grooves . *argus* Attems.
- 7b. Margin of anal valves smooth 8.
- 8a. Metasomites finely wrinkled or bark-like, the surface not shining
leprosus S. Z., *pyrrhozonus* Gerst., *metazonalis* S. Z.
- 8b. Metasomites shining, smooth or with very weak sculpture 9.
- 9a. Lateral lamellae of the gonopod terminated by a long slender cone . . . 10.
- 10a. Lateral cone with dentate edge and divided into a cone and a pointed spine.
50-53 segments. (South America) *oyapokanus* Attems.
- 10b. Lateral cone simple, conical, the terminal edge smooth. 68-74 segments.
(Africa) 11.
- 11a. Lamelliform margins of gonopod telopodite moderately wide
madecassus S. Z.
- 11b. Lamelliform margins very broad, especially at the tip, forming one or two
hollowed cups 12.
- 12a. Width 6 mm. ; the margins of the gonopod telopodite forming two cups with
opposing cavities *diphialephorus* Att.
- 12b. Width 17 mm. ; broad margins of gonopod telopodite twisted in one close
spiral *seychellarum* Gerv.
- 9b. Lateral lamella of the gonopod broadly rounded or with one very short
tooth 9 species (not South African).

192. *Scaphiostreptus diphialephorus* Att.

1914. Attems, *Afrikan. Spirostrept.*, p. 85.

The type-specimen in the Berlin Museum was labelled "South Africa." It is strange that this large species has not been taken by any collectors since, and the above-mentioned label was perhaps erroneous.

* Abbreviated.

Gen. UROTROPIS Silv.

1896. Silvestri, I Diplop., p. 55.

1907. Silvestri, Jahrb. Hamb. Wiss. Anst., xxiv, p. 229.

1914. Attems, Afrikan. Spirostrept., p. 123.

Distribution.—South Africa, West Africa, Cameroon, Guinea.

One species from South America does not seem to be rightly placed in this genus, and probably belongs to a new genus.

Key to the Species of Urotropis.

- 1a. Sternites transversely striated. Anal valves with one knob
propinqua Por., *trachyura* Por.
- 1b. Sternites smooth. Anal valves without knobs 2.
- 2a. Visible part of prosomite smooth and shining. Metasomites not punctate,
scarcely wrinkled. Transverse suture deep *atrata* Por.
- 2b. Visible part of prosomite punctate or roughly wrinkled. Metasomites punctate
or roughly wrinkled. Transverse suture shallow 3.
- 3a. Posterior part of prosomite and whole metasomite roughly wrinkled
carinata Por.
- 3b. Posterior part of prosomite and metasomite densely and finely punctate 4
- 4a. Median lamella of gonopod with a long point surpassing the rest; one smooth
tooth on aboral side. Colour black, with broad clear median band
perpunctata Silv.
- 4b. Median lamella of gonopod with one curved tooth before the end, much shorter
than the terminal lobe; one broad, dentate, thin lamella on aboral side.
Colour dark brown, the middle of the dorsum not clear . . . *micropora* Att.

193. *Urotropis micropora* Att.

1914. Attems, Afrikan. Spirostrept., p. 123.

"South Africa," without precise information as to locality.

Gen. KARTINIKUS Attems.

1914. Attems, Afrikan. Spirostrept., p. 127.

Distribution.—Cameroon (two species), South Africa (one species).

Key to the Species.

- a. Exposed part of the prosomite without transverse furrow; femoral spine of
gonopod short *australis* Attems.
- b. Exposed part of the prosomite with one encircling line. Femoral spine long
colonus Attems, *colonus denticulatus* Attems.

194. *Kartinikus australis* Attems.

1914. Afrikan. Spirostrept., p. 128.

South and South-west Africa (the label gave no precise locality).

Gen. SYNOPHRYOSTREPTUS nov.

The medial leaf of the gonopod is terminated by an egg-shaped lobe ; without distinct lateral cone. The thick cone of the lateral leaf surpasses the knee of the gonopod and the distal part is covered with hairs. The little femoral spine rises on the oral side of the curvature and is directed distally in the same line as the femur. On the end of the femur and tibia a short collar (femoral lobe). At the beginning of the telopodite a short, pointed spine, the telopodite cylindrical, without lamellar borders, the tip trilobed, the lobes very short. Pores beginning on the sixth segment. Collum of male without a lobe on the anterior corner. The covered part of the prosomite with numerous regular concentric furrows. Metasomites with the usual longitudinal furrows on the ventral surface, dorsally smooth or nearly so. Transverse suture distinct. Yellow pits present. Anal segment without tail, not keeled dorsally, the valves with thickened border without furrow on the inner side. Fourth joint of anterior and middle pairs of legs with short pad, fifth joint with tooth-like pad.

195. *Synophryostreptus punctatus* n. sp.

(Pl. XII, figs. 295-297.)

Colour brownish-black ; covered part of prosomite yellowish-brown ; clypeus and antennae dark reddish-brown ; legs brownish-yellow.

Forty-nine segments. Width, in the fore part 3.5 mm., in the middle 3.7 mm. Labral sinus very shallow, the whole head-plate including the vertex very densely punctate, the clypeus in addition longitudinally wrinkled. Supralabral pits, if present, indistinct on account of this sculpture. The inner angle of the eyes surpassing the base of the antennae a little, the distance between the eyes much greater than the diameter of one eye. The ocelli distinctly convex. Interocular furrow not visible, vertex line very weak. The anterior angle of the collum is not at all lobate in the ♂ : the anterior margin is slightly bent forwards at the sides and passes as a broad arch into the lateral margin. Two strong folds beside the marginal furrow. Concealed part of prosomites with numerous fine concentric furrows, passing

gradually into a network of little folds; this network touches the transverse suture in the dorsum; at the sides it is bounded by a transverse furrow at some distance from the suture; behind this furrow the prosomite is longitudinally striated in the same manner as the metasomite. The longitudinal striae of the metasomites nearly reach the pore and are strong on the ventral surface, resembling little ridges. Dorsally to the pore very short longitudinal furrows begin on the suture. The metasomites are densely punctate. The pore opens before the middle on the anterior segments and in the middle on the posterior segments: the transverse suture is also distinct on the dorsum, before the pore it is slightly bent forwards. The large yellow punctures are arranged in one regular row. Anal segment densely punctate and finely wrinkled. The dorsal margin rounded, with a transverse groove, the thickening of the valves fairly high, smooth, not accompanied by a groove on the outer side; without furrow on the inner side. The scale horizontal and arched. Sternites strongly and regularly striated transversely; stigmata triangular or rounded, the lateral margin not surpassing the lateral margin of the sternite. Fourth joint of anterior and middle pairs of legs with a very small, not remarkably prominent pad. Pad of the fifth joint large, tooth-like (fig. 297).

Gonopods (fig. 295): sternite V-shaped, with a sharp angle; inner margin of medial leaf (*AM*) forming two series of steps; at the top a thick, regular, egg-shaped lobe. The broad end of the egg is turned outwards and bears a pointed, slightly curved spine. Lateral leaf (*AL*) terminated by a blunt conical process surpassing the knee of the posterior gonopod and extending as far as the middle of the egg-shaped lobe. Distal part of lateral leaf covered with hairs. The femoral spine rises in the curvature of the knee, is short, straight, directed distally; the femoral portion is short and broad, the femoral lobe very short. The telopodite bears one slender and pointed spine, and describes a complete circle; it is moderately broad, without lamellar enlargements; gradually narrowed towards the tip. The tip is divided into three little lobes (*a*, *b*, *c*). The seminal duct opens on one (*a*) of these lobes (fig. 296).

Junction of Crocodile and Marico Rivers (B. 3402).

Gen. CAMARICOPROCTUS nov.

Femoral spine of gonopod very strong, with an unusually thick basal portion; rising before the coxal knee and directed outwards

in a slight curve, nearly in the same line as the basal part of the coxa. Telopodite of gonopod very short, enlarged and hollowed out like a trowel at the extremity. Gonopod-coxite very simple, without processes; lateral lamella without bristles. Foramina repugnatoria beginning on the fifth segment. No yellow punctures. Anal valves completely lacking margination. Dorsal border of anal segment with flat arch. Anal scale nearly straight and level. Collum of ♂ without lobe in the anterior corner and without curved folds. Prosomites with few but deep encircling lines. Suture dorsally distinct. Fourth and fifth joints of legs padded. Seven supralabral pits.

196. *Camaricoproctus bombycinus* n. sp.

(Pl. XII, figs. 293-294.)

Colour: anterior half of prosomite and posterior half of metasomite yellow; posterior half of prosomite and anterior half of metasomite chestnut. Prosomite blackish as seen through the metasomite. Anterior part of the head, antennae, and legs yellowish.

♂ with 45-47 segments. Width 2.5-2.8 mm.

Labral sinus moderately deep, semicircular. Head-plate very smooth and shining. Interior ocular angle extending not quite so far medially as the base of the antennae. No interocular line; vertex line extremely shallow. Anterior border of collum moderately arched at the lateral border without forming a lobe. The edge of these borders well defined by a furrow. No curved folds. Prosomites with four regular and relatively deep encircling lines; the last of them lies in the middle of the prosomite and is visible when the animal is stretched. Ventrally there are two abbreviated lines as well. The regular fine striation of the metasomites extends ventrally to half-way between the middle and the foramen. Above the foramen the furrows are short, beginning on the suture; dorsally the furrows become punctures and disappear gradually. Whole surface of dorsum dulled by a fine silky punctuation. Foramen on the fifth segment close to the suture; on the following segments it moves gradually towards the boundary of the anterior and middle thirds. No yellow punctures. Sternites with fine polygonal sculpture, without transverse lines. Lateral border of stigmata in a straight line with border of sternite. Dorsal border of anal segment nearly straight transversely. Valves moderately arched, without any marginations. The border itself deepened. Scale nearly transversely truncate. Fourth and fifth joints of legs, including the posterior ones, with large pads.

Gonopods (fig. 293): the small sternite has a flat-arched distal border and is hardly inserted between the bases of the gonopods. The extremity of the medial leaf of the gonopod is a little enlarged, but has no lateral cones. The external lamella has a deep sinus in the middle. The lateral leaf bears the pores of some glands, but no area of bristles. Gonopod telopodite (fig. 294): femoral spine (*Cd*) very strong, slightly bent and continuing nearly in the direction of the praefemur. Telopodite very broad and short; on the opposite side of the femoral spine is a blunt tooth (*t*). The extremity is enlarged and hollowed out like a trowel; from this large plate rise several small plates and lobes and the slender curved branch with the prostate canal.

Caledon (14658); Ashton (4031); Pass at Avontuur (7328); River Zonder End, Caledon Div. (7321); Matjesfontein (13474), Cape.

Gen. ALLOPORUS Porat.

1914. Attems, *Afrikan. Spirostrept.*, p. 111 (references to literature). Number of segments 54-64. Width 5.4-12 mm.

Labral sinus narrow, moderately deep. Clypeus densely punctate, coarser in the fore part, and also often wrinkled here so that the supralabral pits may disappear. Number of supralabral pits four, rarely six. Interocular line visible. Vertex line fine. Inner angle of eye extending a little further inwards than base of antennae; the space between the eyes as large as or a little larger than the diameter of an eye. Collum with an anterior lobe, whose sides converge or are parallel (the latter case rare); the tip rounded. Two to three folds. The encircling lines of the prosomite run straight from sternum to sternum. The last space usually equal to two preceding spaces. Visible part of prosomite usually densely punctate, rarely smooth. The longitudinal striation of the metasomite extends in the fore part of body nearly as far as the foramen, on the following segments it falls gradually further short of it. Foramen beginning on the fifth segment; before the middle of the metasomite the suture well developed, curving a little forwards before the foramen. The yellow punctures in a single row or in a larger zone of several irregular rows. The dorsal prominence of the anal segment forms a blunt angle and is usually bounded by one or several shallow grooves. The valves strongly arched, their borders padded, the pad gradually passing into the valve or separated from it by a shallow depression. The whole anal segment densely punctate. The scale broadly arched.

All the legs padded on joints four and five. Sternites usually with fine transverse striation, rarely smooth. Stigma triangular, its outer border in a straight line with the border of the sternum. The femoral spine of the gonopods rising distally to the knee, moderately to very long. Femur with or without lobe. Telopodite cylindrical, or narrow and band-like, with a lateral spine. Gonopod-coxite usually with well-developed lateral cone which often bears a little hook. The lateral leaf is terminated in several species by a long claw. On the inner side there is often a prominence.

Distribution.—South, East, and West Africa, Madagascar, South America.

Key to the Species of Alloporus.

- 1a. Lateral leaf of gonopod bearing a dentate process on inner side before terminal spine 2.
- 2a. On the outer side at the extremity of the gonopod-coxite a short thick cone with a black inwardly curved little hook 3.
- 3a. Lateral leaf of gonopod shorter than medial leaf and not ending in a pointed claw; tip of femoral spine hooked *uncinatus* Att.
- 3b. Lateral leaf terminating in a jointed spine, rising more or less above the medial leaf. Femoral spine of the gonopod with a straight joint 4.
- 4a. With 54 segments. Terminal claw of lateral leaf of gonopod outwardly hooked; bristles covering end of lateral leaf as far as the medial border. Femoral spine describes three-quarters of a circle; the second half unusually broad. Borders of the lobe of the collum parallel *falcatus* n. sp.
- 4b. With 60–64 segments. Terminal claw of lateral leaf slightly curved; bristles covering end of lateral leaf from outer border to middle. Femoral spine describes more than a circle, its distal half not enlarged. Lobe of collum triangular with convergent sides 5.
- 5a. At edge running from inner process of lateral leaf outwards and on a level before and behind are papillae, bearing bristles. Inner process small, and flat surface behind it small. Clypeus finely punctate but not wrinkled. Border of anal valve becoming gradually level *circulus* Att.
- 5b. No papillae either on the edge or on the level surface of the lateral leaf. Inner process larger, like a swallow's nest, and the flat surface which it forms is deep. Clypeus roughly wrinkled. Pad of anal valve separated by a groove from the surrounding level surface 6.
- 6a. Terminal claw of lateral leaf short and rising only a little above the medial leaf. Sternites with irregular transverse striation. Black *rugifrons* n. sp.
- 6b. Terminal claw of lateral leaf very long and rising high above the medial leaf. Sternites smooth. Chestnut colour *castaneus* n. sp.
- 2b. Gonopod-coxite with long and relatively slender lateral cones bearing a hook at the tip. Prosomites smooth, metasomites very finely punctate

levigatus n. sp.
- 1b. Lateral leaf of gonopod without inner process 7.
- 7a. Lateral leaf ending in a long, pointed spine. (Madagascar) *moromangae* S. Z.
- 7b. Lateral leaf rounded, without spine. (South America) $\left\{ \begin{array}{l} \textit{setiger} \text{ Bröl.} \\ \textit{princeps} \text{ Bröl,} \end{array} \right.$

197. (1) *Alloporus uncinatus* Attems.

1914. Attems, Afrikan. Spirostrept. in Chun, Zoologica, xxv, p. 113.

(Pl. XII, fig. 304.)

Colour blackish-brown, concealed part of prosomite yellowish-brown; clypeus, antennae, and legs reddish-brown; the legs sometimes yellowish.

♂, 62-64 segments. Width, in the fore part 8.5, in the middle 9.5 mm.

Four supralabral pits; clypeus finely punctate and more or less wrinkled longitudinally. The sides of the lobe of the collum convergent, the tip broadly rounded, three complete folds and an abbreviated one. Visible part of prosomite and the first third of metasomite densely punctate, rest of metasomite nearly smooth; the last three segments before the anal segment punctate throughout. Yellow punctures in a single row. Sternites nearly smooth; only in the middle of the level surface some small indistinct striolae. The whole anal segment densely punctate and ridged. Pad of valve distinct from surrounding flat surface, but no groove laterally to it.

Gonopods (fig. 304): sternite notched; gonopod-coxite with a black hook on the short lateral cone. Lateral leaf without claw on the inner side, ending with a broad triangular lobe. Before this lobe on the inner side a prominence with a bluntly toothed border. Bristles are present on the outer half of the level surface. Femoral spine large, strongly curved, the end forming a pointed hook. Femoral lobe large, telopodite cylindrical; before the termination a long, thin, very pointed, weakly curved spine.

Chisawasha, Salisbury, Rhodesia (B. 961, 962); Masiene, Chai Chai, Portuguese E. Africa (B. 6021, 6022, 6029). This species has been noted from Shire, E. Africa.

198. (2) *Alloporus falcatus* n. sp.

(Pl. XII, figs. 298-300.)

Colour black; antennae, the borders of the collum, and the legs dark reddish-brown.

♂, 54 segments. Width, in the fore part 7.8, in the middle 8.5 mm.

Clypeus densely and finely punctate, but very weakly wrinkled. The single male has two supralabral pits on the left side, none on the right side. The eyes and lines on the head as in *A. circulus*. Collum

with a large rounded lobe with parallel sides ; two folds (fig. 299). Visible part of prosomite and first third of metasomite densely punctate, rest of metasomite smooth. The yellow punctures in several irregular rows in a rather large zone. Sternites with transverse striations. Pad of anal valve separated from the rest of the valve by a well-developed depression.

Gonopods : the gonopod-coxite (fig. 300) possesses a short and thick lateral cone with an inwardly curved black hook. The lateral leaf is terminated by a large, laterally curved, black hook. The bristles on the oral level surface extend from the lateral border to the medial border (a difference between this species and the others). The base of the bristles is a papilla as in *A. circulus* and *levigatus*. The prominence on the inner side is moderately large ; its border with blunt teeth. No flat surface behind the prominence. Gonopod telopodite (fig. 298) : the femoral spine is strongly curved, but does not describe a complete circle ; its second half unusually broad, the end pointed. The tip divided into the branch with the prostate duct and a curved, slender spine.

Venterstroom (13521).

199. (3) *Alloporus circulus* Att.

1914. Attems, Afrikan. Spirostrept., p. 412.

(Pl. XII, fig. 301.)

Completing the above-mentioned description, I note that laterally to the prominence on the inner side of the lateral leaf of the gonopod, partly on the ridge bounding the flat surface behind the prominence, partly on the level part before and behind this wall, are a number of peculiar little papillae, some bearing a bristle, some a small blackish spine (fig. 301).

Port Elizabeth (Att.).

200. (4) *Alloporus rugifrons* n. sp.

(Pl. XII, figs. 305-306.)

Colour black, the legs dark reddish-brown, concealed part of prosomites dark yellowish-brown.

♂, 60-62 segments. Width 8.5-11.2 mm.

Clypeus strongly wrinkled, so that the four supralabral pits are sometimes indistinct ; otherwise densely and finely punctate. A

rounded lobe with convergent sides on the anterior corner of the collum; two curved folds. Free part of prosomite and the whole metasomite densely punctate and very finely wrinkled; on the posterior half of the metasomite the density of the punctuations diminishes visibly. The encircling lines of the prosomite run straight round the segment. The longitudinal striation of the metasomite remains somewhat distant from the foramen on the anterior segments. Foramina on the boundaries of anterior and middle thirds, the suture before them scarcely curved. The yellow pits in a single row, sometimes isolated punctures in a second row. Sternites with irregular transverse sculpture. Anal valves with a pad, accompanied laterally by a groove; deep, especially below towards the scale. Dorsal border of anal segment with blunt angle. Scale flat-arched, nearly rounded. Pads on the fourth and fifth joints of the legs are present even on the hinder legs.

Gonopods (figs. 305-306): lateral cones very short and thick, with a little blunt hook at the side. Lateral leaf (*Al*) with a slender, outwardly curved claw, longer than the medial leaf. The inner process (*p*) is large and has the form of a swallow's nest. The thick ring bounding the flat surface on the lateral side is bristled. The bristles do not spring from a little papilla as in other species. The femoral spine does not describe a complete circle, and is relatively slender, with straight point.

Swakopmund (976); Otjituo, S.W. Africa (B. 5254); Zoekmakaar, N. Transvaal (B. 4055); Okahandja, S.W. Africa (Michaelsen).

201. (5) *Alloporus castaneus* n. sp.

(Pl. XII, fig. 302.)

The general colour is chestnut; the metasomites a little darker than the prosomites; collum dark brown bordered with chestnut. Antennae and legs dark.

♂, 60-62 segments. Width 11-12 mm.

Lateral sinus moderately deep, the clypeus densely punctate and longitudinally wrinkled, or only punctate; the four supralabral pits always distinct. Interocular line and vertex line visible. Inner angle of eyes acute, extending a good deal further inwards than the base of the antennae. The distance between the eyes greater than the diameter of an eye. Lobe on anterior angle of collum of moderate size with convergent sides; two folds. Encircling lines of prosomite run straight; the last space greater than the two preceding spaces.

Visible part of prosomite and the metasomite very finely and densely punctate; less dense in the posterior half of metasomite, which is nearly smooth. The longitudinal striation of metasomites fine and regular, extending as far as the foramen on the sixth segment, falling more and more short of it on the following segments. Yellow punctures in a single regular row. Sternites smooth. Stigma triangular. Dorsal process of anal segment bluntly triangular, bounded by a fold and transversely wrinkled. Valves densely punctate and finely wrinkled. The pad of moderate size: accompanied in its whole length by a groove, which is not interrupted in the middle as in *A. rugifrons*. Scale flat and arched. Pads on fourth and fifth joints of legs present up to the last pair.

Gonopods (fig. 302): sternite V-shaped, with rounded angle. Lateral leaf terminated by a long acute curved horn, black at the tip and rising considerably above the medial leaf. On the inner side a process bounding a flat surface. The bristles on the outer wall of this surface are long and thin, without a papilla at their base. The medial leaf has an inwardly curved, small black hook. The femoral spine describes a circle, its point is black but not hooked. The telopodite is enlarged at the beginning of the femur; the point is forked; the longer branch carries the canal, the shorter is a little curved spine.

Waterberg (B. 5257), Transvaal; Komatipoort, East Transvaal (B. 9074).

202. (6) *Alloporus levigatus* n. sp.

(Pl. XII, fig. 303.)

Colour black, clypeus and collum dark brown. Antennae and legs yellowish-brown or reddish-brown. Terminal joints of antennae blackish.

♂ 57 segments. Width 5.4 mm., without visible constriction in the anterior segments.

Lateral sinus moderately deep. Four supralabral pits. Clypeus densely and finely punctate, smooth or weakly wrinkled. Vertex smooth and shining. Interior angle of the eye somewhat blunt and only extending a little further inwards than the base of the antennae; the space between the eyes visibly larger than the diameter of an eye. Anterior lobe of collum with convergent and rounded sides; two folds. Prosomite with the usual ringed lines, the rest smooth. Metasomites with extremely fine punctuation, nearly smooth. Yellow punctures in a single regular row. Dorsal prominence of anal segment

bounded by a deep and broad groove and transversely wrinkled. The pad of the valves thick and accompanied on its outer side by a depression. Sternites finely striated transversely.

Gonopods (fig. 303) : the lateral cone relatively long and slender, bearing a little black hook on the tip, especially clearly seen from the aboral side. Lateral leaf with a long, slender, slightly curved black claw. The bristles extend to the base of this claw, but not quite as far as the medial border. Most of them are inserted on little papillae. Prominence on inner border with several teeth. No flat surface behind this prominence. The gonopod telopodite the same as in *A. circulus* ; the femoral spine (*Cd*) describes more than a complete circle and is enlarged in the middle.

Krugersdorp, Transvaal (A. 23403) ; Florida, Transvaal (A. 4088).

Alloporus transvaalicus Dad.

1889. Daday, Termes. Füzetek, xii, p. 123.

Transvaal.

Species dubia.

Gen. GYMNSTREPTUS Bröl.

1902. Subgen. *Gymnostreptus* Brölemann, Myr. Mus. Paulista, pp. 141, 143.

1914. Gen. *Gymnostreptus* Attems, Afrikan. Spirostrept., p. 131.

Subgen. ORTHOPORUS Att.

1914. Attems, Afrikan. Spirostrept., p. 132.

Pores beginning on the sixth segment. Telopodite of the gonopod much enlarged, band-like, or in extreme cases cup-shaped.

Distribution.—South Africa (three species), Madagascar (two species), South America (sixteen species).

Key to the African Species of Orthoporus.

1a. Anal valves not distinctly bordered ; gonopod-coxite without bristles and without lateral cone. Width 2·5 mm. ; 50 segments (Madagascar)

politifrons Attems.

1b. Anal valves with marginal thickening. Lateral lamellae of gonopod with an area of bristles. Lateral cone well developed. Width 4·5 mm. or more ; 57 or more segments 2.

2a. Medial lamellae of gonopod with one broad, blunt lobe on the inside of the tip. Telopodite of the gonopod less enlarged, not cup-shaped but band-like. Labral sinus shallow (Madagascar) *punctatulus* Attems

- 2b. Medial lamellae of the anterior gonopod without inner lobe on the tip. Telo-
podite of gonopod much enlarged, forming a broad cup. Labral sinus deep 3.
- 3a. Sternite of gonopods triangular, with pointed angle; the laterally turned
margin of the coxite-base is sinuate *tabulinus* Att.
- 3b. Sternite of gonopods a rounded transverse plate 4.
- 4a. The laterally turned margin of the coxite is rectilinear . *pyrrhocephalus* Koch.
- 4b. The laterally turned margin of the coxite is lobate *pontifex* n. sp.

I am now convinced, after having examined a great number of specimens of both species, that the characters formerly used by me in distinguishing the two species *G. pyrrhocephalus* and *tabulinus* are not conclusive. That does not say that *tabulinus* is to be withdrawn, but that other characters must be used. The best characters are the form of the sternum of the gonopods and the shape of the laterally turned margin of the medial leaf of the gonopod-coxite. In *pyrrhocephalus* the latter lamella is rectilinear and the sternum is short, arched, and rounded, whilst in *tabulinus* the outer margin of the lamella is sinuate and the sternum long with a pointed angle. The two species are also different in colour and size: *pyrrhocephalus* has a width of 8-10 mm. on an average, *tabulinus* 4-7 mm. In *pyrrhocephalus* the whole head-plate is reddish-brown or red; the vertex rarely somewhat darkened, but never so different in colour as in *tabulinus*, where the clypeus is yellowish as far as the antennae, the vertex blackish. In *pyrrhocephalus* the collum is often red; the trunk annulated with light and dark in *pyrrhocephalus*, uniformly black in *tabulinus*. The thumb-like prominence on the inner side of the lateral leaf of the gonopod is also present in *tabulinus* and the yellow punctures are likewise present in *pyrrhocephalus*, so that on these points the tabular view in "Afrikanische Spirostreptiden" must be corrected.

The supplementary collection from Portuguese East Africa contained a third species intermediate between *pyrrhocephalus* and *tabulinus*. This is described below as *G. pontifex*.

203. *Gymnostreptus pyrrhocephalus* L. Koch.

1865. *Spirostreptus pyrrhocephalus* Koch, Verh. Zool. Bot. Ges.
Wien, xv, p. 888.

1914. *Gymnostreptus pyrrhocephalus* Attems, Afrikan. Spirostrept.,
p. 133.

(Pl. XII, fig. 307; Pl. XIII, fig. 308.)

Colour: head-plate brownish or shiny red; vertex sometimes a little darkened, but never contrasting so much with the clypeus as in
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tabulinus. Collum red or more or less darkened up to completely black. Prosomites yellowish-brown or brownish-red, metasomites blackish-brown. Antennae, anal segment, and legs red.

♂, 53-65 segments. The highest and lowest numbers were found in the same tube from one locality. Width, in the fore part of body 7.2 mm., in the middle 8-10 mm., very seldom only 5.5 mm. Yellow pits in one or two rows (the latter is the more frequent).

The first description must be corrected, but is to be consulted for the other characters. Practically no difference from *tabulinus*. The differences in the gonopods (figs. 307, 308) are discussed above.

Cape Province.—Hogsback, Amatola (B. 932, B. 934); Matjesfontein (A. 23362); Commandofontein, near Adelaide (7506); Port St. Johns (A. 23367); Pass at Avontuur (7326); Grahamstown (A. 23381); Prince Albert (1542); Montagu (B. 949, B. 4108); Tulbagh Road Station (1529); Zwartberg Pass (1532); Gt. Winterhoek (B. 2266, B. 2268, B. 2265, B. 2237, B. 2235); Port Elizabeth (7612, 7613); Piquetberg, near Bergvlei River (7560); Onder Bokkeveld (7550); Burghersdorp (14634). *Natal*.—Krantzkop (B. 965).

Porat has described a species which is perhaps identical with *pyrrhocephalus*. His description of the gonopods *apice valde dilatato* and of the colour give rise to this conjecture, which could only be made certain of by a re-examination of Porat's type. The name of this species is :

Spirostreptus ruficeps Brandt.

1872. Porat, Myr. Afric. Austral., Öfvers. Vet. Ak. Förh., Nr. 5,
p. 31.
Caffraria. Species dubia.

204. *Gymnostreptus tabulinus* Attems.

1914. Attems, Afrikan. Spirostrept., p. 134.

(Pl. XIII, figs. 309, 311-314.)

Head-plate as far as a point between the antennae, the latter and the legs reddish-yellow or reddish-brown. Vertex and trunk black, or the prosomites yellow or reddish-brown and the metasomites blackish. Anal valves yellowish-brown.

♂, 46-64 segments. I notice that specimens with the highest and the lowest numbers are found in the same locality. The most frequent numbers are 56-59. Width 4.2-7.2 mm.; rarely 3 mm. (in

specimens from Gouda and Paarl with gonopods like those of the large specimens). Lateral sinus moderately deep; four supralabral pits; clypeus smooth or moderately wrinkled; interocular line scarcely visible, vertex line very shallow. Inner ocular angle extending a little further inwards than base of antennae; space between eyes considerably larger than diameter of an eye. Collum with an almost pointed lobe in the anterior angle; two strong, somewhat irregular folds.

The numerous punctate concentric lines of the prosomite run straight round to the sternum; the last space equal to two preceding spaces in width and with fine leathery wrinkles. Suture well developed, curved forwards slightly before the foramen. Foramen nearer to the suture than to the hind border. Diameter of metasomite not visibly larger at the posterior border than in the fore part. Longitudinal striation of metasomite somewhat distant from the foramen at the seventh segment. Metasomites dorsally smooth. Yellow pits in a single transverse row. Anterior half of sternum with shallow and irregular sculpture. Dorsal prominence of anal segment triangular, blunt, the pad of valve moderately high but not sharply bounded. Scale flat, triangular.

Gonopods: extremity of gonopod-coxite with an oblique backwardly directed cone whose length and direction vary considerably (see figs. 309, 311–313). The extremes are quite different but connected by many transition stages, so that I cannot distinguish subspecies by this character. The extremity of the lateral cone is sometimes hooked. My note in the original description, that the lateral leaf has no thumb-like tooth (fig. 311 *ld*) on the inner side, must be corrected; the tooth is present but difficult or impossible to see from the aboral side, because it rises on the inner side. Gonopod telopodite without femoral spine; it describes two curves, and then is enlarged into a broad, rounded plate; the slender terminal portion with the canal has a little swelling before the tip.

This species is the commonest of all *Spirostreptidae* in the Cape Province.

Cape Province.—Houw Hoek; Venster Ravine, Caledon; Cape Flats, Gordon's Bay, Hout Bay, Simonstown, Camps Bay, Hermanus, Kalk Bay, Orange Kloof, Steenbrass, Kirstenbosch, Knysna, Slanghoek (Worcester), Gt. Winterhoek, Swellendam, Kogman's Kloof, Krakadouw Pass, River Zonder End, Graaff-Reinet, Gouda, Tulbagh Div., Paarl, French Hoek.

Nos. 7349, 7364, B. 928, 13506, B. 2286, B. 2265, B. 2267, 7643,

7737, 73410, A. 23395, 1674, 7723, 7556, 1593, A. 23352, 7735, 7747, 7640, A. 23408, A. 23413, A. 23412, A. 2325, 150112, 7630, 14662, A. 2332, A. 2330, A. 23340, B. 5272, 7652, 150099, 7448, 1508, 7671, 7472, 7702, B. 950, 7647, 7324, 7325, 1667, B. 988, 14663, B. 4032, B. 3365, 7513, 7473.

205. *Gymnostreptus tabulinus* var. *exaratus* (new var.).

(Pl. XIII, fig. 310.)

This variety agrees with the type form in all points except the sculpture of the metasomites; it has on the dorsum broad and shallow longitudinal grooves, separated by narrow rounded keels; there are approximately 30 grooves between the pores, not equally distinct in every metasomite.

Colour black, the concealed part of prosomite yellowish. Clypeus and antennae reddish-brown.

♂, 55 or 56 segments. Width 7.5 mm. (gonopods, see fig. 310).

Hermanus, Cape Province (23371).

206. *Gymnostreptus pontifex* n. sp.

(Pl. XXIII, fig. 528.)

Colour nearly black; prosomites dorsally, or dorsally and laterally, reddish-brown; head-plate red or reddish-brown, sometimes a blackish band between the eyes; collum red or reddish-brown with a broad posterior black margin. Legs reddish-brown or yellowish-brown; anal segment the same.

♂: length 70 mm.; width 5.8 mm.; 45-48 segments.

Labral sinus very shallow, four supralabral pits; clypeus smooth; interocular sulcus not visible, longitudinal sulcus sharp. Inner angle of eyes surpassing widely the inner basal edge of the antennae. Anterior border of collum not produced forwards, consequently no lappet in the anterior angle; or the angle weakly rounded forwards, the specimens differing a little in this point. Encircling furrows of the prosomite numerous, the distance between the furrows increasing gradually. Metasomites dorsally shining and smooth, with very shallow, broad impressions. The upper two or three longitudinal sulci under the pore are abbreviated. Posterior dorsal margin of anal segment rounded; marginal thickening of anal valves high and broad, laterally not sharply defined. The scale arcuate. The yellow punctures arranged in one row. Sternites with one transverse furrow

in the anterior part, otherwise smooth. Tibia and postfemur of all legs padded; the pads half as long as the joints.

Gonopods (fig. 528) resembling those of *S. pyrrhocephalus* and *tabulinus*. Sternite of gonopods a low transverse plate as in *S. pyrrhocephalus*, and the laterally turned lappet at the base of the coxite is similar to that of *S. tabulinus*, and still larger. The telopodite differs from the telopodite of *S. pyrrhocephalus* and *tabulinus* in being still thicker in the first part after the knee.

Zandemela (B. 6025) and Masiene (6028), both near Chai Chai, Portuguese E. Africa.

2. Tribe *Trachystreptini* Cook.

1896. Fam. *Trachystreptidae* Cook and Collins, Crasp. of N. America, p. 5.

1896. Fam. *Trachystreptidae* Cook, Brandtia, xiii.

1909. Subfam. *Trachystreptinae* Attems, Schultze's Forsch. Reise, p. 40.

1909. Subfam. *Trachystreptinae* Attems, Zool. Anz., xxxiv, p. 157.

1914. Tribe *Trachystreptini* Attems, Afrikan. Spirostrept., p. 141.

1926. *Trachystreptini* Attems, Kükenthal's Handb. d. Zool., iv, p. 200.

The diameter of the metasomite is considerably greater than that of the prosomite. Metasomite with strong longitudinal keels resembling those of *Lysioptelidae*. The last strip of the prosomite with similar, but smaller and not exactly corresponding keels. Dorsal margin of anal segment broadly arched, without prominence. Valves strongly raised, the margin thickened, accompanied by a groove on the outer side and often with a furrow on the inner side. Scale truncated. Pores beginning on the sixth segment. Legs mostly not padded. Gonopods known only in *Lophostreptus*; without or with femoral spine, a large broad lobe on the femur. Telopodite slender and cylindrical.

Distribution.—Africa, from Abyssinia through East Africa to South Africa (one doubtful genus, *Tropitrachelus* Silv. in the Carolines).

Cook is the author of most of the genera, which are characterised by the differences in their sculpture. I have already expressed my opinion as to the validity of these genera.

Five tubes contained *Trachystreptini* of three distinct species, two of *Lophostreptus* and one of *Calostreptus*, in the sense of Cook. All are females, so that I cannot much advance our knowledge of these animals.

Gen. LOPHOSTREPTUS Cook and Collins.

1895. *Lophostreptus* Cook and Collins, Crasp. of N. Amer., Ann. N. York Ac. Sci., ix, p. 5.
 1896. *Lophostreptus* Cook, Brandtia, xiii, p. 57.
 1896. *Lophostreptus* Pocock, Ann. Mag. Nat. Hist., (6), xvii.
 1903. Brölemann, Boll. Soc. Ent. Ital., xxxv, p. 145.
 1907. *Lophostreptus* Attems, Myr. Kilimandjaro-Meru Exped. Sjöstedt, p. 30.
 1914. *Lophostreptus* Attems, Afrikan. Spirostrept., p. 141.
 1896. *Ptilostreptus* Cook, Brandtia, xiii, p. 57.
 1896. *Anastreptus* Cook, *ibid.*, p. 55.

Hitherto the gonopods of only six species of *Trachystreptini* have been known. These species are so nearly related that it is best to put them all in the same genus. Carl, in the "Revue Suisse de Zoologie," xvii, has pointed out that several genera were established by Cook only on specific characters, and weak characters besides. I share this view, and I believe that the genus *Anastreptus* Cook, conceived as a subgenus of *Lophostreptus* in the "Afrikanische Spirostreptiden," falls into the genus *Lophostreptus*. The difference between the subgenera *Lophostreptus* and *Anastreptus* is that *Lophostreptus* has no, or only short, keels on the collum, whilst *Anastreptus* has keels on the whole surface of the collum. The new species *Lophostreptus carli* coincides with *Lophostreptus* in having abbreviated keels on the collum, and with *Anastreptus strongylotropis* (the only species of *Anastreptus* whose gonopods are known) in the presence of a femoral spine on the gonopods. The best we can do is to wait till more species are sufficiently studied, and till we can define the genera with higher probability of their phylogenetic correctness.

I give two keys, one based upon the male characters for the seven species of which we know the males, and a second for all the species.

Key to the Species of Lophostreptus, based upon the Males.

- 1a. The tibia or the tibia and the postfemur of the anterior legs padded . . . 2.
- 2a. Telopodite of gonopod without femoral spine, the lappet on the top of the gonopod not hairy. Tibia and postfemur padded. No keels on the posterior margin of the collum; antennae short . . . *regularis* Att.
- 2b. Gonopod with strong femoral spine. At the tip of the gonopod a hairy lappet. Only the tibia padded. Collum with short longitudinal keels on the posterior margin. Antennae long and slender . . . *carli* n. sp.
- 1b. Anterior legs not padded 3.

- 3a. Telopodite of the gonopod with a little basal spine. The keels of the collum occupy the whole surface *strongylotropis* Att.
 a. The keels of the metasomite undivided *strongylotropis strongylotropis* Att.
 β. The keels divided by a constriction *strongylotropis constrictus* Att.
 3b. No basal spine on the gonopod. Collum with abbreviated keels or without keels 4.
 4a. In the middle of the posterior border of the collum some short longitudinal keels 5.
 5a. Lateral cone of coxite of gonopod broadly rounded. 42-46 segments *bicolor* Carl.
 5b. Lateral cone of coxite pointed. 50 segments *armatus* Poc.
 4b. No keels in the middle of the collum 6.
 6a. The head and collum nearly smooth *kandti* Carl.
 6b. The head and collum densely punctate *philostreptoides* Carl.

Key to all the Species of *Lophostreptus*.

- 1a. The anterior part of the collum smooth in the middle (keels present only on the sides or along the posterior border) 2.
 2a. In the middle of the posterior border of the collum some short longitudinal keels 3.
 3a. Anterior legs padded. Telopodite of gonopod with femoral spine *carli* n. sp.
 3b. Anterior legs not padded. No femoral spine. East Africa *bicolor* Carl.,
 armatus Poc.
 2b. No keels in the middle of the posterior border of the collum 4.
 4a. Head and middle of the collum nearly smooth, not punctate. East Africa *kandti* Carl.
 4b. Head and collum strongly punctate 5.
 5a. Whole prosomite or its dorsum and sides yellow, metasomite blackish-brown 6.
 6a. Fourth and fifth joints of anterior legs padded *regularis* Att.
 6b. None of the legs padded *tersus* Cook.
 5b. Somites uniform dark brown 7.
 7a. Thickened border of anal valves smooth, separated by a furrow from the inner margin; laterally accompanied by a deep groove *cameranii* Silv.,
 ptilostreptoides Carl.
 7b. Thickened border of anal valves deeply punctate. The furrow on the inner margin as in *cameranii*; the groove laterally to the thickening, weak *ulopygus* n. sp.
 1b. Keels occupying whole surface of collum 8.
 8a. Keels of metasomite entire (not constricted in the middle) 9.
 9a. Each metasomite with about 50 keels *andreini* Bröl.
 9b. Each metasomite with 35-37 keels *strongylotropis* Att.
 8b. Keels of metasomite divided into two halves by a constriction in the middle 10.
 10a. Both halves of each keel (anterior as well as posterior) tooth-like posteriorly *scalatus* Karsch.
 10b. Anterior half of each keel rounded posteriorly *strongylotropis constrictus* Att.

207. *Lophostreptus cameranii* Silv.

1896. Silvestri, Boll. Mus. Zool. Torino, xi, No. 257, p. 3.

Colour blackish-brown, legs yellowish; antennae with joints 1-5 yellowish, the rest brown.

♀, 47-49 segments. Width 3-4 mm.

Head-plate in the fore part more weakly, on the vertex deeply punctate and wrinkled. Interocular line not visible. Vertex line weak. Collum laterally narrowed, posterior border straight; the sides with 2-3 deep folds, the first close to the margin, and 6-7 short keels beginning on the posterior margin. Middle of dorsum free of keels, the whole collum roughly punctate and wrinkled. Anterior corner broadly rounded and somewhat prominent. First part of prosomite, more than one-third, with fine, irregular cross-furrows; then a strip with a network of fine raised lines, continued on the dorsum as far as the transverse suture, separated at the sides from the suture by a strip of fine wrinkles and grooves. The first zone of the metasomite has a smaller diameter than the rest of the metasomite; the furrows or grooves between the keels make it appear to be composed of a row of rounded pits. Silvestri says, "sutura profunda grosse punctata."

Longitudinal keels of metasomites numerous; deepened space between them grooved, wrinkled, and punctate; abbreviated smaller keels here and there, beginning on the suture or on the posterior border. Posterior margin of metasomite serrated by the prominent keels. The pores are situated in the middle of the metasomite in front of one abbreviated keel; the space before the pore smooth, the pore very small. Yellow punctures are in a single regular row. Anal segment punctate and wrinkled and without keels. Thickened border of anal valves smooth; on the inner side separated by a furrow from the margin; on the outer side accompanied by a deep groove. Sternites transversely striated.

Bulawayo, Matabeleland (7455); Karungula, Matabeleland (Silv.).

208. *Lophostreptus ulopygus* n. sp.

Colour dark brown or black.

♀, 47-54 segments. Width 3.5 mm. (54 segments) to 5 mm. (47 segments).

Head and collum roughly punctate as in *cameranii*. Collum: shape the same as in *cameranii*, laterally narrowed, the posterior border straight. Anterior and lateral margin finely bordered; two strong folds and 15 or 16 short keels, disappearing gradually in rough wrinkles.

Prosomites as in *cameranii*; the first zone with fine, anastomosing concentric furrows, passing gradually into the network of raised lines of the second zone; this zone touches the suture on the dorsum; at the sides it is separated by a third zone with longitudinal furrows. The longitudinal keels of the metasomite are higher and further apart than in *cameranii*. No abbreviated keels. The spaces between the keels with pits. Very small pores in the middle of the metasomite, between two keels. Yellow punctures in a single regular row. Sternite transversely striated.

Thickening of anal valves very broad; wrinkled and punctured in the same manner as the whole anal segment. The groove lateral to the thickening is weak; the furrow on the inner side the same as in *cameranii*. No dorsal keels on the anal segment.

Transvaal.—Kaapmuiden (B. 4041); 20 miles from Pietersburg, Zoutpansberg Dist. (7490); Venterstroom (13522); Barberton (7482).

209. *Lophostreptus carli* n. sp.

(Pl. XXIII, figs. 529, 530.)

Colour: metasomites dark brown, prosomites dark brown down the middle, lateral parts of dorsum yellowish, ventral side darker, the boundary of the two colours irregular. Anterior part of clypeus, the antennae, and the legs yellowish-brown.

Width: ♂, 4 mm.; ♀, 5 mm. ♀ with 44 segments (all ♂♂ being broken, the number of segments cannot be determined).

Whole head-plate densely and almost roughly punctate; some broad, shallow, longitudinal wrinkles. The labral sinus moderately deep; four supralabral pits. Antennae long and slender, reaching the posterior border of the fifth segment. Collum with one row of longitudinal keels along the whole posterior margin. The spaces between the median keels occupied by rough punctures; the non-keeled anterior part densely punctured in the same manner as the head. Anterior angle rounded but not prominent. Two strong, curved folds and one abbreviated fold. The anterior part of the prosomite with very dense, fine, circular furrows; the posterior part with a network of fine ridges. Transverse suture indistinct. The anterior part of the metasomite has the same diameter as the prosomite; then the metasomite is enlarged and covered with about 70 sharp longitudinal keels; these keels are regular and project at the posterior border as rounded teeth. Spaces between the keels roughly punctured. Abbreviated keels between the regular keels are scarce. Pore situated in the anterior

part of one enlarged and forked keel. The yellow punctures very large, oval, in a single row.

Thickening of anal valves very broad, separated by a broad furrow from the fine marginal border and wrinkled on the surface. The ring part and the anal scale roughly wrinkled. Dorsal process broadly rounded. Posterior border of anal scale nearly straight. Sternites with regular and dense transverse striae. Penultimate joint of the legs with a large pad projecting like a tooth. The preceding joint indistinctly or not padded.

Gonopods (figs. 529, 530) : lateral cone of the coxite large, abruptly pointed. On the anterior side of the medial border near the tip a blunt lappet turned outwards. Lateral leaf high, broadly rounded, bearing an area of long bristles. Femoral spine (*Fd*) of medium size, situated in the curve, pointed, slightly curved and parallel to the succeeding part of the telopodite. Distally from this spine a strong, abruptly pointed process (*a*). The telopodite becomes filiform ; before the tip a little lateral lappet ; the tip itself is divided into a rounded, hairy little appet and a branch bearing the prostate canal.

Masiene, Chai Chai, Portuguese E. Africa (5991, 5995).

Gen. CALOSTREPTUS Cook.

1896. Brandtia, xiii, p. 56.

First segment with a prominent ridge running from opposite the eye to near the posterior corner, in front of which the segment is hollowed out to receive the antennae. The concave part is finely striate, the part above the ridge distinctly carinate, the carinae becoming gradually shorter. Front part of prosomites with many concentric striations, the posterior part finely and distinctly reticulate as far as the carinae ; transverse suture not marked by a distinct transverse line ; last segment with a median carina ; anal valves with submarginal ridges having distinct rugulose sulci. Sternites with transverse striations.

210. *Calostreptus carinatus* n. sp.

Colour blackish-brown, antennae and legs yellowish-brown.

Forty-seven segments. Width 3.5 mm.

Eyes not numerous. Keels of the metasomite regular, high, relatively far apart, their posterior end prominently dentate. The spaces between the keels finely reticulate. Between the main keels there are shorter ones, beginning on the suture. Pores minute, opening in the fork of a keel. Dorsal segment roughly punctate and

wrinkled, with a weak longitudinal keel. Thickening of valves smooth, separated laterally by a broad groove from a second smaller thickening; on the inner side a furrow separating them from a small border. Scale truncate.

Salisbury, Rhodesia (B. 3352).

The type of *Calostreptus*, *C. chelys* Cook from German East Africa, has never been described, so that I cannot say whether this species differs from the type.

2. Subfam. TRIAENOSTREPTINAE Attems.

1914. Attems, Afrikan. Spirostrept., p. 148.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 200.

Prostate duct forked, each branch opening on a separate lobe of the telopodite. Whole medial border of gonopod-coxite bent outwards and enlarged at the tip to a broad, rounded lobe.

Distribution.—Ethiopian Region.

Synopsis of the Genera.

- 1a. Femoral spine of gonopod with several lateral spines *Graphidostreptus* Attems.
- 1b. Femoral spine simple 2.
- 2a. Stigmata triangular, not surpassing the lateral margin of the sternite. Femoral spine rising just before the knee. *Metasomites* smooth dorsally
Triacnostreptus Attems.
- 2b. Stigmata very long in a transverse direction, far surpassing the lateral margin of the sternite. Femoral spine rising at some distance behind the coxal knee. *Metasomites* dorsally striated . . . *Plagiotaphrus* Attems.

Gen. TRIAENOSTREPTUS Attems.

1914. Attems, Afrikan. Spirostrept., p. 149.

The coxal spine rises from the coxal knee; it is long and more or less flattened and band-like, generally curved, rarely straight. The telopodite of the posterior gonopod is band-like and enlarged in its first part, describing a spiral; then it becomes slender and cylindrical; only in *T. unceiger* does it bear a little lateral spine. The tip is tripartite, the seminal duct forked, each arm opening on a separate branch; the third lobe is broader. A small lamella at the tip sometimes bears small points. The sternite is V-shaped, with acute or blunt angle. The outwardly bent margin of the anterior gonopod is narrow in its whole length only in *T. kymatorhabdus*; in the other species the tip is enlarged, forming a broad lobe sometimes surpassing the lateral margin. In *T. petersi* this lobe is relatively flat and hollowed on the

aboral side, while it is thick and globular in the other species. The lateral leaf is rounded and covered with hair at the tip. There are concentric furrows on the ventral surface or parallel to the transverse suture, or one or several of them are bent backwards to meet the last furrow. The metasomites are very densely and finely punctate; the longitudinal furrows are continued dorsally from the pore, either on all the segments or only in the anterior half of the body. The yellow punctures are arranged in a single row. The legs are padded from the third to the last pair in the fourth and fifth joints. 4-7 supralabral pits. Labral sinus deep. Sternites smooth or with traces of small weak striae. Stigmata triangular, the lateral margin in a straight line with the lateral margin of the sternite. Dorsal margin of anal segment with blunt angle. The thickening of the valves moderately high and rising gradually. Scale with blunt angles or rounded.

One of the six species is found in West Africa, the other five in South Africa.

Key to the Species of Triaenostreptus.

- 1a. Gonopod-coxite with a large lateral cone (6) *conatus* n. sp.
- 1b. No lateral cone on coxite of gonopod 2.
- 2a. Telopodite of gonopod with a little lateral spine (1) *unciger* n. sp.
- 2b. Telopodite of gonopod without lateral spine 3.
- 3a. Outwardly bent medial margin of gonopod-coxite not appreciably enlarged at its end and extending only as far as the middle. On the hindmost area of the prosomite, between the last concentric furrow and the transverse suture, is a fine sinuate line (sometimes broken up into little ridges)
 - (2) *kymatorhabdus* Attems.
- 3b. Outwardly bent medial margin of gonopod-coxite enlarged at the tip, forming a knob which surpasses the lateral margin 4.
- 4a. Concentric furrows of prosomite very numerous; on every segment some of the latter become irregular and are bent backwards, meeting the last concentric furrow, which remains straight. Base of terminal knob of gonopod not surpassed by a rounded lamella on the aboral side . . . (3) *triodus* Attems.
- 4b. Concentric furrows of the prosomite less numerous and regular on the ventral surface; only last furrow bent backwards. Base of terminal knob of gonopod surpassed by a rounded lamella 5.
- 5a. Terminal knob of gonopod slighter, its aboral side hollowed and cup-like. The lamella passing from the lateral knob enters this cup. ♂ with 60-64 segments (4) *petersi* Karsch.
- 5b. Terminal knob of gonopod thick and globular, not hollowed on the aboral side. ♂ with 69-73 segments 6
- 6a. The space between the last concentric furrow and the transverse suture with a little sinuate or vault-shaped stria, as in *kymatorhabdus*. The metasomites very smooth on the dorsum. Femoral spine straight . . . (5) *krügeri* n. sp.
- 6b. In the space between the last concentric furrow and the transverse suture no sinuate striae. Metasomites dorsally with short longitudinal striae and somewhat rugged. Femoral spine curved . . . *tripartitus* Cook and Collins.

211. (1) *Triaenostreptus unciger* n. sp.

(Pl. XIII, figs. 318-320.)

Colour: metasomites black, prosomites blackish or yellowish-brown; antennae, clypeus, and legs very dark reddish-brown.

♂, 69 segments; width, in the fore part 11·8 mm., in the middle 13 mm., collum 12·3 mm. ♀, 73 segments; width, in the fore part 12·6 mm., in the middle 14·7 mm., collum 13·5 mm.

Labral sinus deep; 6-7 supralabral pits. Anterior part of clypeus strongly or weakly wrinkled and densely punctate. Vertex smooth. Internal angle of eyes pointed, surpassing base of antennae; space between the eyes less than the diameter of an eye. Interocular and vertex lines distinct. Collum the same as in *T. triodus*; anterior angle with a large lobe. Superior margin of this lobe and anterior margin of collum at right angles to each other. Lobe rounded and thickened, the inferior margin somewhat convex; 3-4 straight and one or several curved furrows.

Concentric furrows of prosomite straight as far as the sternite; only the last bent backwards, the last space not much wider than the preceding one, and longitudinally striated on the ventral surface as in the metasomite; dorsally densely punctate and rugged; the first strip of the metasomite the same, the rest of the metasomite smooth dorsally; the longitudinal furrows of the metasomite are strong on the ventral surface; dorsally to the pore they are weak lines, completely absent in the middle of the dorsum. The yellow punctures are large and arranged in a single close-set row.

Anal segment densely and finely wrinkled; its dorsal margin triangular and blunt, not separated by a transverse groove. The marginal thickening of the valves moderately high, rising gradually. Anal scale with a blunt angle and rounded apex. Sternites smooth, in the middle several hardly visible fine striae. The stigmata triangular, their lateral margins in a straight line with the sternite. Posterior pairs of legs padded.

Gonopods (figs. 318-320): the tip of the medial leaf is bent outwards, forming a thick knob, similar to that of *triodus* and *krügeri*: on the aboral side (fig. 319) a short lamella, passing into the lateral knob (*k*) close to the point where the posterior gonopod arises. On the surface of this a low, rounded knob (*M*). The tip of the lateral leaf is rounded and covered with hair (fig. 318). Telopodite: femoral spine (*Cd*) long, straight, and pointed; first part of telopodite band-

like and describing a circle, then becoming slender and bearing a lateral spine (*s*) which easily distinguishes this from the other species.

Vryburg, Transvaal (B. 3366).

212. (2) *Triaenostreptus kymatorhabdus* Att.

1914. Attems, Afrikan. Spirostrept., p. 157.

Walfish Bay, S.W. Africa (Att.); Farm Paulinenhof, near Windhoek (Michaelsen Coll.).

213. (3) *Triaenostreptus triodus* Attems.

1909. *Spirostreptus triodus* Attems, Schultze's Forsch. Reise Südafrik., p. 46.

1914. *Triaenostreptus triodus* Attems, Afrikan. Spirostrept., p. 150, pl. iv, figs. 76-79.

(Pl. XIII, fig. 322.)

Concentric furrows of prosomite becoming irregular on the ventral surface, bending backwards and meeting the last furrow; but this last furrow remains straight and does not meet the transverse suture. The metasomite is very finely and densely punctate (seen so only under the microscope). Dorsal process of anal segment strongly wrinkled. The gonopods* are distinguished from those of *krügeri* by the shape of the aboral side of the coxites. Here the terminal knobs are so placed on the surface that between the two a deep slit is formed; the fold proceeding from the lateral knob beside the praefemur to the tip lies under the terminal knob; while in *krügeri* there is a free, prominent lamella lying at the base of the terminal knob. The knob on the lateral side has several secondary knobs. In one ♂ from Otjiwarongo it is mammiform. The oral side of the coxite is like that of *krügeri*. The tip of the lateral leaf is covered with hair and the surface is deepened. The femoral spine of the gonopod is S-shaped. The telopodite is band-like, forms a circle in its first part, and is then abruptly narrowed and describes another circle (fig. 322).

Du Toit's Pan, Kimberley (1567); Upington, Cape Province (B. 5260); Ababis (2218), near Maltahohe, S.W. Africa (2219); Livingstone (13713), Rhodesia; Otjiwarongo (B. 5293). Kalahari: Kang; between Kang and Kgokong; between Lookaneng and Severelela; Damaraland, Otjuo, Otjimbingue (Schultze); Okawango, Okahandja, Grootfontein (Michaelsen), S.W. Africa.

* See figures in Attems, Schultze's Forsch. Reise.

214. (4) *Triaenostreptus petersi* (Karsch).

1884. *Spirostreptus petersi* Karsch, Neue Juliden, Zeit. Ges. Nat., lix, p. 20.

1914. *Triaenostreptus petersi* Attems, Afrikan. Spirostrept., p. 152.

(Pl. XIII, fig. 321.)

Gonopods: medial margin of gonopod-coxite bent outwards; enlarged at the tip, forming a thick knob surpassing the lateral margin; on the inner side this knob is not so broadly rounded as in the other species, but is more prominent. The aboral side of the gonopod-coxite is deepened. From this depression rises a rounded lamella (*l*) connected with the lateral knob (*k*) next to the praefemur. This knob is thick and blunt and curved towards the aboral side (fig. 321). The lateral leaf is terminated by a short, rounded lobe, and covered with short hairs. The oral plane is deepened. The femoral spine of the gonopod is strongly curved. The telopodite is first band-like and describes a spiral, then slender and cylindrical.

Mazoe, Mashonaland (1865); Tette, Portuguese East Africa (Karsch); Mozambique (Cook).

215. (5) *Triaenostreptus krügeri* n. sp.

(Pl. XIII, figs. 315-317.)

Colour black, the covered part of prosomite yellow and brown. Legs dark reddish-brown.

♂, 69-71 segments. Width, collum 10.4 mm., in the fore part 9.7-10.2 mm., middle 11.4-11.7 mm.

Labral sinus deep, rounded; seven supralabral pits, the outer more distant. Clypeus weakly wrinkled. Vertex smooth. Ocelli very flat; inner angle of eyes surpassing the antennae. Space between the eyes equal to the diameter of an eye. Interocular and vertex lines distinct. Lobe on anterior corner of collum broad, thickened, with three complete and several abbreviated furrows.

Concentric furrows of prosomite running direct to the sternite; only the last bent backwards. The last space, as in *T. kymatorhabdus*, covered with fine, sinuate striae, sometimes indistinct; otherwise very finely wrinkled and punctate; ventral surface longitudinally striated as in the metasomite. Longitudinal furrows of metasomite unbroken as far as the pore; dorsally to the pore they are very weak and generally abbreviated; on the dorsum they disappear completely. Metasomite very densely and finely punctate, otherwise smooth (not

wrinkled). Yellow punctures arranged in a single compressed row. Anal segment densely punctate and the posterior part finely wrinkled. Dorsal prominence not separated by a groove. The moderately high thickening of the valves rises gradually. Scale angular and blunt. Sternites smooth; the lateral margin of the triangular stigmata in a straight line with the lateral margin of the sternite. Legs padded from the third to the last pair.

Gonopods (figs. 315, 317): on the aboral side of the gonopod-coxite (fig. 317) a rounded lamella (*l*) whose outer margin extends as far as the lateral knob beside the telopodite. This lamella lies on the base of the terminal knob, so that no slit is visible between this knob and the trunk. The knob beside the telopodite as in *triodus*, but no secondary little knobs are visible. Lateral leaf densely covered with short hairs; its anterior plane deepened. Femoral spine straight; the telopodite resembling that of *triodus*, but the first band-like part does not describe a complete circle. The tip (fig. 315) with three branches.

Krugersdorp, Transvaal (A. 23403).

216. (6) *Triaenostreptus conatus* n. sp.

(Pl. XXIII, figs. 531–533.)

Colour black; legs and antennae dark reddish-brown; anterior part of prosomite (not visible if the animal is straightened) yellowish. ♂ width 12–12.5 mm.; 60–64 segments. ♀ width 14 mm.

Head-plate densely and finely punctate but not wrinkled. Labral sinus very deep and narrow; four supralabral pits. Anterior corner of collum forming a broad, rounded lappet; two strong, curved folds and some abbreviated folds. Circular furrows of the prosomite numerous, somewhat irregular and anastomosing, running straight to the sternite (also in the seventh segment); the punctuation very fine, visible only with a strong lens. The fine longitudinal sulci of the metasomites are present also above the pores, till half-way from the pore to the median line. The pores distant from the transverse sulcus. Sternites smooth; cavity for the stigmata short and rounded. Anal valves moderately compressed. The medial border arising gradually, not thickened abruptly. Scale triangular; dorsal angle of the anal segment triangular-rounded. The yellow punctures arranged in one row. The tibia and postfemur of the legs padded, except in the last four pairs.

Sternite of gonopods (fig. 531) triangular, with broad base. The

laterally directed median lamella of the coxite enlarged distally, but only to the middle of the whole width; on the lateral side a large, pointed cone constricted at the base. Lateral lamella scarcely surpassing the knee of the telopodite; the lateral part of the tip of this lamella is finely pubescent. The basal spine of the telopodite (fig. 532) arises from the knee; it is long and slender and nearly straight. The telopodite, band-like in the beginning, becomes a slender cylinder, terminated by three branches; proximal to this branching is a transverse rounded ridge, beset with microscopic hairs (fig. 533).

Masiene (6421), Zandemela (6023), both near Chai Chai, Portuguese E. Africa.

Gen. *PLAGIOTAPHRUS* Attems.

1914. Attems, *Afrikan. Spirostrept.*, p. 160.

Stigmata very broad in the transverse direction, far surpassing the lateral margin of the sternite. Only *Thyropygus* (of the family *Harpagophoridae*) has similar stigmata. Pores beginning on the sixth segment. Prosomites with regular concentric furrows running direct to the sternite. Suture distinct. Metasomites longitudinally striated on the whole dorsum, or the posterior segments are smooth dorsally. Anal segment without prominent tail. The thickening of the valves without a furrow on the inner side. Four supralabral pits. Labral sinus narrow and deep. ♂ collum with a lobe at the anterior angle. Fourth and fifth joints of legs padded. Femoral spine of posterior gonopod rising somewhat distantly from the knee; it is large and curved. Telopodite slender. Seminal duct forked; each branch opening on a separate lobe. Gonopod-coxite with slender lateral cones.

Distribution.—East Africa (one species), South Africa (one species).

217. *Plagiotaphrus longius* n. sp.

Metasomites reddish-brown or blackish, prosomites yellowish, legs reddish-brown.

♀, 70 segments. Width, in the fore part 11·5, in the middle 15 mm.

Labral sinus narrowed and deep. Whole clypeus with fine leathery wrinkles. Inner angle of eyes sharp, far surpassing base of antennae; the space between the eyes less than the diameter of an eye. Interocular furrow scarcely visible. Ocelli distinctly convex. Collum (of ♀) very broad at the sides, the side margin convex; three complete and several abbreviated furrows. Distance between the very regular

concentric furrows of the prosomite increasing gradually. Exposed part of prosomite and metasomite very densely and finely wrinkled. The longitudinal furrows are indistinctly and partially visible on the dorsum of the anterior segments; they disappear in the wrinkles.

Umtali (13741), S. Rhodesia.

The position of this species is not quite certain, as only the female is known, but its resemblance to *P. sulcifer* is so striking that we may presume it is a *Plagiotaphrus*. It differs from *P. sulcifer* in the number of segments (the latter has 70, it has 57) and the less distinct longitudinal striation of the dorsum and the more prominent inner angle of the eye. The male will furnish better characters.

Gen. GRAPHIDOSTREPTUS Attems.

1909. Attems, Aethiop. Myr., Zool. Jahrb., xxvii, p. 414.

1914. Attems, Afrikan. Spirostrept., p. 154.

218. *Graphidostreptus gigas* Pet.

1862. *Spirostreptus gigas* Peters, Reise Mossamb., p. 536.

1872. *Spirostreptus gigas* Porat, Myr. Afric. Austral., Öfvers. Vet. Ak. Förh., v, p. 29.

1914. *Graphidostreptus gigas* Attems, Afrikan. Spirostrept., p. 155.

Porat has determined specimens collected by Wahlberg in Caffraria as *gigas*. At the time that Porat's paper was published there was only one genus "*Spirostreptus*," now identical with the order *Spirostreptoidea*, and the identification of Porat calls for confirmation. In any case it is remarkable that nobody else has taken this species, which is notable on account of its size.

Known from Mozambique, south of Zambesi, Zanzibar, Mombasa, Gambia.

2. Fam. HARPAGOPHORIDAE Attems.

1909. Attems, Schultze's Forschungsreise, p. 40.

1914. Attems, Afrikan. Spirostrept., p. 161.

1926. Attems, Kükenthal's Handb. d. Zool., iv, p. 201.

Gonocoel of gonopods opening throughout its length on the lateral side, or the basal part opening on the oral side and then running

obliquely to the lateral side, so that only a small part of the lateral leaf is visible from the oral side. Telopodite of gonopod terminated by a plate, usually bearing a row of strong, hooked spines. Anal segment usually with a prominent tail. Scale sometimes coalesced with the annular part of the anal segment.

Carl has published two new genera in two interesting papers, and therefore a small modification of the diagnosis of the family is necessary. The genus *Stenurostreptus* Carl has no hooked spines at all on the terminal plate of the telopodite of the gonopod. These spines have been hitherto considered one of the important characters of the family; the new genus must nevertheless be placed in the family *Harpagophoridae*, because as regards all other characters it belongs to this family. *Stenurostreptus* is a very interesting intermediate form between two groups, as Carl has pointed out.

Synopsis of the Genera of Harpagophoridae.

- 1a. Stigmata very long in a transverse direction, far surpassing the lateral margin of the sternite *Thyropygus* Poc.
- 1b. Stigmata short, triangular, not surpassing the lateral margin of the sternite 2.
- 2a. The terminal plate of the telopodite of the gonopods bears no hooked spines. A long curved coxal spine present *Stenurostreptus* Carl.
- 2b. The terminal plate of the telopodite bears a row of strong, hooked spines or (in *Phyllogonostreptus*) a row of short, straight bristles 3.
- 3a. Femoral knee without spines or with only one short, blunt tooth 4.
- 4a. Terminal plate of telopodite with a row of strong, hooked spines; at some distance from the femoral knee a short spine. Metasomites dorsally with deep longitudinal furrows *Ktenostreptus* Attems.
- 4b. Terminal plate of telopodite bearing only a row of short, straight bristles. Coxae of gonopod without any spine. Metasomites without noticeable sculpture *Phyllogonostreptus* Carl.
- 3b. Femoral knee of gonopod with one or two long spines 5.
- 5a. Femur of gonopod with two spines or processes. Telopodite of gonopod beginning with a knob-like enlargement, projecting laterally. (Africa) *Harpagophora* Attems.
- 5b. Femur of gonopod with one pointed spine, telopodite without knob-like enlargement at the beginning 6.
- 6a. Anal segment without a tail *Anurostreptus* Attems.
- 6b. A projecting tail present 7.
- 7a. Tail compressed in a dorso-ventral direction, blunt and straight. Anal valves without any thickening on the margin. Fourth joint of anterior legs weakly, fifth joint distinctly padded *Eremobelus* Attems.
- 7b. Tail cylindrical, longer. Margin of anal valves thickened 8.
- 8a. Fifth joint of legs padded (Asia) *Rhynchoproctus* Poc.
- 8b. Fourth and fifth joints of legs padded. (South Africa) *Poratophilus* Silv.

Gen. HARPAGOPHORA Attems.

1909. Attems, L. Schultze's Forschungsreise Sudafrika, ii, p. 41.

1914. Attems, Afrikan. Spirostrept., p. 162.

Key to the Species of Harpagophora.

- 1a. Femur of gonopods with two nearly equal simple spines, one of them directed transversely outwards. A narrow edge separated by a small furrow from the rest of the border on the anterior margin of the collum 2.
- 2a. A long lateral cone present on the gonopod-coxite. Tip of gonopod divided into a typical comb lamella, a slender spine, and a pointed lamella; metasomites dorsally punctate and striate. Sternites transversely striate
spirobolina Karsch.
- 2b. Gonopod without lateral cone. On the tip of the gonopod two large lamellae, the one corresponding to the comb lamella bearing several structures like the blades of a knife. Metasomites dorsally smooth. Sternites smooth
levis n. sp.
- 1b. One spine of the two femoral spines of the gonopod is strong, with two or more points; the second slender and directed obliquely outwards. No small furrow on the border of the collum and consequently no narrow edge separated off 3.
- 3a. The larger of the two femoral spines divided into two very large divergent points. At the tip of the gonopod a relatively long and slender plate. (The spine-branch of the gonopod is a simple, long, and slender spine)
diplocrada Attems.
- 3b. The larger of the two femoral spines with two small points; the tip of the gonopod rounded on the inner side, or if narrowed (*nigra*) shorter than in *diplocrada* 4.
- 4a. The spine-branch of the gonopod is a simple, strong, black tooth, the margins not distinctly denticulated 5.
- 5a. The black point at the tip of the large femoral spine of the gonopod is divided at right angles. No teeth on the medial margin of the gonopod. Posterior angle of collum passing a little beyond the posterior border. Marginal thickening of anal valves angular on the inner side
monodus Attems.
- 5b. The whole of the black point on the large femoral spine straight; on the medial margin of the gonopod a curved, distally directed, pointed tooth. Posterior angle of collum rounded, not surpassing the posterior border. Marginal thickening of anal valves rounded on the inner side . . . *nigra* Attems.
- 4b. Spine-branch of gonopod with several spines besides the principal spine. (Both points of the large coxal spine straight. Posterior angle of collum not projecting) 6.
- 6a. On the prosomite close before the suture numerous short, sinuated, or raised transverse striae; collum broad at the sides. Prominent margin at tip of inner side of anterior gonopod beginning with a pointed tooth (figs. 324, 325)
polyodus Attems.

- 6b. Prosomite before the suture granulated or smooth, at most with very indistinct striae; sides of collum narrowed. The prominent inner margin of the anterior gonopod disappears gradually without forming a tooth in the basal part of the margin 7.
- 7a. On the medial margin of the gonopods a little tooth. The spines of the spine-branch of the gonopod are separated by a sinus from the comb lamella
alokopyga Attems.
- 7b. No teeth on the medial margin of the gonopod. The spines of the spine-branch are continued without a break on the comb lamella
dittoktenus Attems.

219. (1) *Harpagophora levis* n. sp.

(Pl. XIII, figs. 328-331.)

Colour: dorsum yellowish or reddish-brown, with a transverse black spot covering the posterior half of every metasomite; the sides and the ventral surface chestnut, bordered with black at the sides. Head with antennae, legs, and lobe of collum yellowish; anal segment the same, but the tail and the borders of valves blackish.

♂, 44 segments; width 6.4 mm. ♀, 45 segments; width 7.6 mm.

Labral sinus moderately deep, four supralabral pits. Clypeus in the fore part roughly, then finely punctate. Ocelli distinctly convex; inner margin of eyes hardly surpassing base of antennae. Interocular furrow scarcely visible, vertex line very weak, both meeting in a pit. Vertex shining and polished. Anterior and lateral margin of collum forming a right angle, the angle somewhat rounded; anterior margin moderately broadly bordered; posterior margin straight in the male, so that no prominence is visible at the posterior angle. The border has no furrow, as in *dittoktenus* and *diplocrada*, parallel to the margin and separating a narrow edge from the rest of the border.

Concentric furrows of prosomite numerous, somewhat irregular; space between last concentric furrow and transverse suture covered dorsally with short, raised, or sinuate striae; at the sides these striae are oblique. Metasomites dorsally very smooth, ventral surface with the usual regular longitudinal furrows. Pore small, at junction of anterior and middle thirds; dorsally to the pore very fine longitudinal striae, becoming gradually weaker and disappearing completely on the dorsum. Sternites smooth. Stigma large, the sides more divergent than the sides of the sternite. Tail moderately long, the tip curved upwards. Scale rounded; valves moderately raised; the border abrupt but not separated by a furrow; no small furrow on inner side of border.

Gonopods (fig. 328) : distal part of gonopod-coxite forming a deep groove, protecting the distal spine. Medial lamella of this groove with a pointed tooth directed basally, lateral lamella with a blunt tooth on the outer side. Gonopod telopodite with two femoral spines (fig. 331) nearly equal in length, the one directed straight distally and concealed in the gonopod, the second transverse and free. There is also a third short tooth directed distally. The telopodite (figs. 329, 330) is different from those of the other *Harpagophora* ; the spine-branch (*Dp*) being a broad, rounded lamella, with a 2-pointed lobe at the side. The branch with the seminal duct (*kb*) is also a broad plate, beset with several structures like the blades of a knife, the tip curved.

Riet Vlei, Umvoti Distr., Natal (7752).

220. (2) *Harpagophora spirobolina* Karsch.

1881. *Spirostreptus spirobolinus* Karsch, Neue Jul., Zeitschr. Ges. Nat., liv, p. 28.

1914. *Harpagophora spirobolina* Attems, Afrikan. Spirostrept., p. 163.

(Pl. XIII, fig. 323.)

Van Rhynsdorp, Cape Province (1650) ; Kentani ; S.W. Africa (Karsch).

221. (3) *Harpagophora diplocrada* Attems.

1909. Attems, Myr. in Schultze's Forsch. Reise, p. 42.

Maltahohe (B. 2221), Gamis (B. 22150), Otjiwarongo (S.W. Africa), Gt. Namaqualand, Damaraland, South Hereroland, Walfish Bay (Att.), Rehoboth, Karibib, Windhoek (Michaelsen).

222. (4) *Harpagophora monodus* Attems.

1909. Attems, Myr. in Schultze's Forsch. Reise, p. 43.

Steinkopf, Little Namaqualand (1544) ; Kamaggas, Steinkopf, Little Namaqualand (Attems).

223. (5) *Harpagophora nigra* Attems.

1914. Attems, Afrikan. Spirostrept., p. 164.

Clanwilliam (7594), Port Elizabeth (7408), Caledon, Cape Province (23339), Hopefield ; Cape Province (Attems).

224. (6) *Harpagophora polyodus* Att.

1909. Attems, Myr. in Schultze's Forsch. Reise, p. 45.

(Pl. XIII, figs. 324, 325.)

Clanwilliam (7568), Matjesfontein (13473, 23363), Little Namaqualand (Att.).

225. (7) *Harpagophora alokopyga* Att.

1909. Attems, Myr. in Schultze's Forsch. Reise, p. 44.

Little Namaqualand (Attems).

226. (8) *Harpagophora dittoktenus* Attems.

1914. Attems, Afrikan. Spirostrept., p. 165.

(Pl. XIII, figs. 326, 327.)

Ashton, in soil under bushes in the Karroo (1672). Cape Province (Attems).

Some species published as "*Spirostreptus*" belong perhaps to the genus *Harpagophora*. Except in *S. marginatus* Por. only females are described, so that a re-examination of the types would be of little use. For the sake of completeness they are mentioned here :

Spirostreptus attenuatus Brandt.

1893. Porat, Bihang. Sv. Ak. Handl., xviii, p. 36.

Little Namaqualand (♀).

Spirostreptus clavatus Vog.

1878. Voges, Zeitschr. Wiss. Zool., xxxi, p. 170.

Africa (♀).

Spirostreptus marginatus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 38.

Caffraria (♂).

Spirostreptus meinerti Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 37.

Caffraria (♀).

Spirostreptus falcicollis Por.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 36.

Little Namaqualand, Caffraria (♀).

Spirostreptus flavifrons Porat.

1872. Porat, Öfvers. Vet. Ak. Förh., v, p. 35.
Caffraria.

Spirostreptus erythropareius Brandt.

1872. Porat, *loc. cit.*, p. 86.
1893. Pocock, Ann. Mag. Nat. Hist., (6), xi, p. 135.
Cape, Caffraria.

Gen. PORATOPHILUS Silv.

1897. Silvestri, Neue Diplop., Abh. K. Zool. M. Dresden, vi, p. 16.
1914. Attems, Afrikan. Spirostrept., p. 167.
1917. Carl, Spirostrept. Nouv., Rev. Suisse Zool., xxv, p. 383.

When I published the "Afrikanische Spirostreptiden" a single species (*australis*) was known, and that very incompletely, from an insufficient description by Silvestri. Since then Carl has described three new species in a very clear manner; I doubt whether these three species belong to the same genus as *australis*. The drawings given by Silvestri are so incomplete that one cannot make a detailed comparison with the drawings of Carl, but it seems that the form of the gonopods is generically different from that in the three recent species, which undoubtedly belong to the same genus as the five species described here as new. Whether Carl's species and mine belong to *Poratophilus* in the sense of Silvestri could only be verified by a re-examination of the type of *australis*, which is impossible for me now; and I prefer to leave all the species in the genus *Poratophilus*, proposing the name *Philoporatia* for the eight new species if *australis* should prove itself to be generically distinct.

The species of *Poratophilus* are extremely similar and the females of several species are not distinguishable. *P. punctatus* is relatively easy to recognise on account of its dense punctuation on the anterior half of the metasomite. Carl says that *distinctus* has a lobe at the anterior angle of the collum, absent in the other species. Otherwise there is a great degree of uniformity. The minute distinctions in external sculpture are difficult to describe. As regards colour I cannot say much, because it has been altered by long immersion in bad alcohol. Also the individual variability of the most important character, the gonopods, cannot be determined, seeing that each species is represented by only a single specimen. It is a very peculiar fact that the material contained six tubes of *Poratophilus* and every

tube a different species. *Poratophilus* is a genus which I especially recommend for further investigation with more ample material, investigation which can only be carried out by somebody in South Africa.

Distribution.—South Africa.

Key to the Species of Poratophilus.

- 1a. Gonopod-coxite enlarged distally and broadly rounded, without prominent tooth either within or without *australis* Silv.
- 1b. At the tip of the medial margin of the gonopod-coxite one or two pointed teeth rise above the inner side; on the outside also there are toothed or lobed prominences 2.
- 2a. On inner side of medial margin two pointed teeth; femoral spine of gonopod directed obliquely inwards, freely visible in its greater part. ♂ with 44 segments *diplodontus* n. sp.
- 2b. On inner side of medial margin only one inwardly directed tooth. Femoral spine directed straight distally and nearly concealed under the lobe of the gonopod-coxite; or directed transversely inwards. ♂ with 47-53 segments 3.
- 3a. Femoral spine long, slender, curved and inwardly directed; on the outside of the extremity of the gonopod-coxite a slender prominence 4.
- 4a. Thumb on apex of gonopod with several lobes or teeth; free part of prosomite and anterior zone of metasomite densely and relatively coarsely punctate, with irregular longitudinal stripes *punctatus* n. sp.
- 4b. Thumb on gonopod a simple smooth hook without lateral lobes 5.
- 5a. Internal spine of anterior lamella of gonopod-coxite long, directed obliquely downwards; tip not hooked. Terminal margin of posterior lamella smooth *robustus* n. sp.
- 5b. Internal spine of anterior lamella shorter, directed transversely inwards; tip hooked. Terminal margin of posterior lamella sinuate or undulated *sabulosus* n. sp.
- 3b. Femoral spine of gonopod a straight prolongation of the praefemur and nearly concealed by lobes of gonopod-coxite. No prominence on outside of gonopod-coxite 6.
- 6a. The forwardly and inwardly directed terminal lobes (*a*) of the posterior lamella of the gonopod-coxite touch or cross one another 7.
- 7a. These lobes cross one another; the inner margins of the gonopod-coxites are weakly divergent. Terminal margin of inwardly directed tooth on medial border has several smaller teeth *similis* Carl.
- 7b. The lobes touch one another without crossing; inner margins of gonopod-coxites diverge strongly. Tooth on medial border of lamella is smooth, without teeth *junodi* Carl.
- 6b. Terminal lobes of gonopod-coxite remain distant from one another 8.
- 8a. Collum with distinct lobe in the anterior angle. 48 segments. Width 7 mm. *distinctus* Carl.
- 8b. Anterior angle of collum not lobed. 53 segments. Width 10·7 mm. *brevilobatus* n. sp.

227. (1) *Poratophilus australis* Silv.

1897. Silvestri, Neue Diplop., Abh. Ber. Mus. Dresden, vi, p. 17.
South Africa (no precise information).

228. (2) *Poratophilus diplodontus* n. sp.

(Pl. XIII, fig. 332 ; Pl. XIV, figs. 333-335.)

Prosomites and anterior half of collum yellowish-brown ; rest of body dark reddish-brown ; basal joints of legs yellowish, terminal joints dark brown.

♂, 44 segments. Width in fore part and middle 7.5 mm.

Clypeus punctate, with 1+5+1 supralabral pits, otherwise smooth, not wrinkled ; internal angle of eyes as in *junodi*, the interocular line invisible. Sides of collum in ♂ not enlarged and without a lobe at the anterior angle ; anterior and lateral margins forming a right angle, the angle itself rounded. Encircling lines on prosomites numerous, fine, irregular ; in the first segments they are bounded posteriorly by a straight furrow ; the last space between this furrow and the suture has short, undulating lines. In the middle and hinder segments the encircling lines pass gradually into these short strokes without separation by a straight furrow. Metasomites completely smooth.

Gonopods (figs. 333, 334) : the gonopod-coxites are distinguished from those of all other species in that the medial margin of the anterior lamella bears two pointed, inwardly directed teeth (*z.z.*), whilst in the other species there is only one tooth. The inwardly turned lobe of the posterior lamella is long, distally narrowed, and broadly rounded. The femoral spine of the gonopod rises obliquely inwards and is directed distally, visible through its greatest part (not concealed under the lobes of the gonopod-coxite). The thumb is cylindrical, the tip blunt and curved into a semicircle ; the comb lamella bears a long, straight spine and some small spines close together (I was not able to see a thin hyaline edge). The second lamella (*p*) is rounded (figs. 332, 335).

Johannesburg, Transvaal (7305).

229. (3) *Poratophilus punctatus* n. sp.

(Pl. XIV, figs. 351-354.)

Antennae, legs, and anterior half of prosomites yellowish-brown, the rest of the body dark chestnut.

♂, 49 segments. Width 8.3 mm.

Clypeus not very densely, but irregularly, punctate and wrinkled; the number of supralabral pits cannot be given with accuracy. Labral sinus very deep. Inner angle of eyes extending very little beyond base of antennae. Sides of collum not narrowed, anterior and lateral margins forming nearly a right angle. Encircling lines of prosomite bounded posteriorly by a straight furrow; last space with short undulating lines and finely wrinkled. First zone of metasomite very densely punctate, posterior part with scattered punctuation and irregular, fine, longitudinal lines. The punctuation of the metasomites easily distinguishes this species from *robustus* and *sabulosus*.

Gonopods: the lateral (posterior) lamella of the gonopod-coxite (figs. 351, 352) bears on the outer side a strong, somewhat curved, blunt tooth (*l*), which is otherwise found only in *robustus*. The inwardly turned lobe (*a*) is short, rounded, and does not extend as far as the interior margin. The terminal margin between these two prominences is trilobed. The femoral spine (*Cd*) is very long and slender and directed transversely inwards, in this way not being concealed under the lobes of the gonopod-coxite. The thumb (*d*) bears several partly pointed, partly rounded lobes; the teeth of the comb (*Kb*) with hyaline edge. The second lamella (*p*) rounded. The border curved upwards (figs. 353, 354).

Dunbrody on the Sundays River, Uitenhage Div. (7376).

230. (4) *Poratophilus robustus* n. sp.

(Pl. XIV, figs. 347-350.)

Anterior half of prosomite yellowish-brown, posterior half dark reddish-brown, metasomite reddish. Anterior part of the clypeus, antennae, and legs dark reddish-brown.

♂, 48 segments. Width 9 mm., the fore part and middle equally wide.

Labral sinus deep, clypeus densely and coarsely punctate, so that the supralabral pits are indistinct; I observed 1+3+1. Interior angle of eye extending a very little further inwards than base of antennae. Interocular furrow weak; vertex line shallow. Collum as in *junodi*, without lobe in the anterior angle; sides not narrowed, anterior angle nearly a right angle; marginal border somewhat thickened; one curved fold indistinct. Encircling lines of prosomite numerous, fine, somewhat irregular, posteriorly passing gradually into short sinuate stripes; free part of prosomite finely wrinkled; anterior half of metasomite with scattered punctuation, posterior half smooth.

Sternites smooth. Anal segment and cushions of the legs as in *junodi*.

Gonopods: tip of lateral (posterior) leaf bent forwards; on the outer side a little blunt and slender tooth (*l*); on the inner side hardly any prominence. Medial (anterior) leaf terminated by a large, strong hook (*7*) directed towards the inside and base. Femoral spine (*Cd*) of the gonopod clearly visible, with a long sickle-like curve directed inwards. Thumb (*d*) slender, pointed, with smooth margins. Comb lamella (*Kv*) with 13 strong blades having hyaline margins and a darker centre; second lamella (*p*) rounded, with a lobe on one side (figs. 348, 350).

Louis Trichardt, N. Transvaal (B. 4080).

231. (5) *Poratophilus sabulosus* n. sp.

(Pl. XIV, figs. 343-346.)

Prosomite reddish-brown, gradually darkened posteriorly. Metasomite reddish-brown; antennae and legs dark brown.

♂, 46 segments. Width, in the fore part 9.2 mm., in the middle 10.6 mm.

Clypeus in the fore part densely and coarsely punctate and longitudinally wrinkled. Vertex with scattered punctuation and transverse wrinkles; six supralabral pits. Collum with the beginning of a lobe; anterior margin curving a little forwards and forming an acute angle with the side margin; corner rounded; sides of collum punctate. Encircling lines of prosomite numerous, somewhat irregular, passing gradually into short transverse or oblique stripes covering the hindmost space; encircling lines and short stripes not separated by a straight furrow. Metasomite dorsally with scattered punctuation; otherwise shining and smooth. Longitudinal ridges extending as far as the foramen in the anterior segments and nearly as far in the following segments. Foramen situated between first and second quarters; suture slightly curved forwards before the foramen. Sternites smooth. All legs with pads. Anal segment as in other species.

The gonopods (figs. 343-346) strongly resemble those of *robustus*, but differ in the following points: the spine (*z*) on the inner margin of the anterior lamella is shorter, transversely directed, and hooked; the forwardly bent margin of the posterior lamella is sinuate (not smooth as in *robustus*); the thumb (*d*) is short, broadly rounded.

Coldstream, Humansdorp, Cape Province (B. 5297); Otjiwarongo; Grootfontein Distr. (Michaelsen).

232. (6) *Poratophilus brevilobatus* n. sp.

(Pl. XIV, figs. 339–342.)

The colour of all the segments passes from yellowish-brown or reddish-brown on the anterior margin of the prosomite to reddish-brown on the posterior margin of the metasomite, so that the body is annulated.

♂, 53 segments. Width, in the fore part 9.3 mm., in the middle 10.7 mm.

Five supralabral pits; clypeus with fine and coarse punctuation and weakly wrinkled. Eyes and collum as in *junodi*. Encircling lines of prosomite as in *junodi*; on the anterior half of the body the short stripes on the hindmost area are bounded by a straight furrow; in the posterior half they disappear gradually. Free part of prosomite and anterior zone of metasomite with weak longitudinal stripes; the rest of metasomite smooth. Sternites smooth. Anal segment and pads of legs as in *junodi*.

The gonopods (figs. 339–342) resemble those of *distinctus*, having inwardly directed lobes (*a*) at the tip of the posterior lamella; but here the lobes are shorter and do not touch one another. The anterior lamella has a single, strong, pointed, inwardly curved hook (2), surpassing on the inside the terminal lobe of the posterior lamella. The gonopod telopodites are badly preserved, so that the description is not complete. Spine-branch as in *similis*, broadly rounded, with a lobe on one side. Femoral spine as in *similis*, straight, and nearly concealed under the lobes of the gonopod-coxite (figs. 341, 342).

Mozambique (1613). (There is no reference to the exact locality.)

233. (7) *Poratophilus junodi* Carl.

1917. Carl, Spirostrept. Nouv., Rev. Suisse Zool., xxv, p. 384.

(Pl. XIV, figs. 355, 356.)

Colour chestnut; collum, head-plate, basal half of the antennae, anal segment, and legs yellowish.

♂, 48 or 49 segments. Width 9–10 mm.

Clypeus wrinkled and punctate; distance between the eyes greater than the diameter of one eye. Collum not lobate at the anterior angles, the angles rounded. No folds or furrow except the marginal furrow. Anterior half of prosomite with numerous irregular furrows, posterior half with one complete furrow and one interrupted stria;

oblique striae at the sides ; densely punctate and striolate ; anterior strip of metasomite also punctate and striolate, but less densely ; posterior half of metasomite nearly smooth. Regular longitudinal furrow nearly reaching the pore ; short furrows dorsally to the pore, beginning on the suture. Anal segment with pointed tail, slightly curved upwards. Legs padded on the fourth and fifth joints from the third to the last pair.

Gonopods (figs. 355, 356) : the gonopod-coxites touch at the base and then diverge. The lamella projects on the inner side in the form of a pointed, curved process (*z*), rounded at the tip ; the lateral or posterior lamella is bent inwards, with a broad, rounded, finger-shaped lobe (*a*). The femoral spine is partly concealed by the posterior lamella. The thumb-like structure is slightly curved. The second lamella is rounded.

Umtali, S. Rhodesia (13730) ; Masiene, Chai Chai, Portuguese E. Africa (B. 6031) ; Shiliowane, Transvaal ; Rikatla, Portuguese E. Africa (Carl).

234. (8) *Poratophilus similis* Carl.

1917. Carl, Rev. Suisse Zool., xxv, p. 387.

(Pl. XIV, figs. 336-338.)

Colour : metasomites, the posterior border of the collum, and the vertex chestnut or dark brown ; the rest yellowish-brown.

♂, 47-49 segments. Width : ♂, 8.5 mm. ; ♀, 9 mm.

Shape of body, sculpture of head and somites, transverse suture, anal segment, and legs as in *P. junodi*. Sides of the collum with some punctures. Exposed part of prosomite dorsally with more numerous and distinct striae than in *P. junodi*. Gonopod-coxites (figs. 336, 337) shorter and less divergent than in *P. junodi*. The distal margin of the tooth (*z*) on the inner side of the medial lamella is denticulate. The inwardly directed lobes of the lateral lamella (*a*) cross (while they only touch or are some distance apart in *P. junodi*). Gonopod telopodite (fig. 338) as in *P. junodi*.

Twenty miles east of Pietersburg, Zoutpansberg Distr., Transvaal (7491) ; Masiene, Chai Chai, Portuguese E. Africa (B. 5997) ; Rikatla, Portuguese E. Africa (Carl).

Gen. THYROPYGUS Poc.

1894. Pocock, Max Weber's Reise Ostindien, p. 379.

1896. Silvestri, I. Diplopodi, p. 66.

1902. Saussure and Zehntner, Grandidier Madagascar, pp. 175, 178.

1914. Attems, Afrikan. Spirostrept., p. 107.

This genus is easily distinguishable on account of its stigmata, which are very much extended in a transverse direction. The Indo-Australian Region contains a large number of species; one species is described from Madagascar and one from South Africa.

235. *Thyropygus orthurus* Silv.

1897. Silvestri, Neue Diplop., Abh. Ber. Mus. Dresden, vi, p. 16.

The drawings of the gonopods given by Silvestri are not sufficiently complete. *T. orthurus* is a doubtful species.

Natal.

Spirostreptidae incertae sedis.

The following species will perhaps be recognisable when the type-specimens are better studied :—

Spirostreptus cristulatus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 28.

Caffraria.

Spirostreptus heros Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 29.

Caffraria.

Spirostreptus melanopus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 32.

Caffraria.

Spirostreptus notatus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 39.

Caffraria.

Spirostreptus wahlbergi Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 27.

Caffraria.

The following descriptions are practically useless and the type-specimens are mostly females :—

Spirostreptus adumbratus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 30.

Cape.

Spirostreptus angulicollis Karsch.

1881. Karsch, Zeitschr. Ges. Naturw., (3), vi, p. 50.
S.E. Africa.

Spirostreptus anodontus Ck. and Coll.

1893. Cook and Collins, Ann. N. York Ac. Sci., viii, p. 32.
Cape Town.

Spirostreptus annulatus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 34.
Cape.

Spirostreptus brevicornis Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., No. 4, p. 102.
Cape.

Spirostreptus capensis Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., No. 4, p. 93.
Cape.

Spirostreptus coarctatus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 33.
Caffraria.

Spirostreptus corvinus L. Koch.

1865. L. Koch, Verh. Zool. Bot. Ges. Wien, xv, p. 887.
Algoa Bay.

Spirostreptus flavofasciatus Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 101.
Cape.

Spirostreptus gracilis Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 94.
Cape.

Spirostreptus graeffei L. Koch.

1865. L. Koch, Verh. Zool. Bot. Ges. Wien, xv, p. 889.
Algoa Bay.

Spirostreptus laticollis Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 96.
Cape.

Spirostreptus limbatus Por.

1872. Porat, Öfvers. Vet. Ak. Förh., p. 34.
Caffraria.

Spirostreptus melanopygus Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 96.
Cape.

Spirostreptus rotundatus Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 109.
Cape.

Spirostreptus subpartitus Karsch.

1881. Karsch, Zeitschr. Ges. Naturw., (3), vi, p. 50.
S.E. Africa.

Spirostreptus trigonyger Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 109.
South Africa.

Spirostreptus triplicatus Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 109.
Cape.

Spirostreptus validus Brdt.

1841. Brandt, Bull. Sci. Ac. Imp. St. Petersb., p. 104.
Cape.

2. Superfam. ODONTOPYGIDEAE Attems.

1909. Fam. *Odontopygidae* Attems, Zool. Anz., xxxiv, p. 157.

1909. Fam. *Odontopygidae* Attems, Sjöstedt's Kilimandjaro-Meru
Exp., p. 34.

1909. Suborder *Odontopygidea* Attems, Schultze's Forsch. Reise,
p. 39.

1914. Suborder *Odontopygidea* Attems, Afrikan. Spirostrept., p. 180.

1926. Superfam. *Odontopygidae* Attems, Kükenthal's Handb. d.
Zool., iv, p. 202.

Both sternites of seventh segment of ♂ well developed. The gonopod telopodites are bent inwards medially on leaving the canal of gonopod-coxite. Femur of the gonopod without or with a spine. Gonopod telopodite more complicated, with a long tibial process and well-developed tarsus.

Posterior margin of the metasomites usually beset with fringes. Praebasilare different in the two sexes, longer and broader in the fore part in the ♂, shorter and uniformly broad in the ♀. Mentum hollowed out, the posterior margin of the groove sharp. Anal valves generally with a tooth at the termination of the upper surface.

There is one family :

Fam. ODONTOPYGIDAE Attems.

Of the three subfamilies, *Odontopyginae*, *Peridontopyginae*, and *Lissopyginae*, only the first is represented in South Africa. It is distinguished from the other two subfamilies by the spiral torsion of the gonopod telopodite between praefemur and femur and by a constriction between femur and tibia.

Synopsis of the Genera of Odontopyginae.

- 1a. Tip of tibial process of gonopod twisted into a spiral (8) *Helicochetus* Attems.
- 1b. Tibial process not twisted 2.
- 2a. Tip of tibial process of gonopod enlarged, plate-like. Two femoral spines, two tibial spines (9) *Solenozophyllum* Attems.
- 2b. Tibial process pointed (only in *Haplothysanus polybothrus* a small lobe), 0-1 femoral spines, 0-1 tibial spines 3.
- 3a. Tarsus of gonopod a long cylinder, shaped like a sausage
Allantogonus Attems.
- 3b. Tarsus leaf-like, denticulate or lobate 4.
- 4a. Prosomite without concentric striations; the four distal joints of the seventh pair of legs of ♂ somewhat reduced; anal valves without tooth at upper end *Syndesmogenus* Attems.
- 4b. Prosomites with concentric furrows 5.
- 5a. Tibial process of gonopod short and broad, with two strong lateral teeth or barbed hooks *Rhamphidarpe* Attems.
- 5b. Tibial process long and slender 6.
- 6a. Tibial process with one lateral spine near the base and sometimes with a second spine near the end *Plethocrossus* Attems.
- 6b. Tibial process without lateral spines in the basal half, rarely with one or a few minute spines near the tip 7.
- 7a. Tarsus of gonopod not beset with hairs, spines, saw-teeth, etc., nor with strongly fringed margins 8.
- 8a. No femoral spine (1) *Odontopyge* Brandt-Attems.
- 8b. One femoral spine present (2) *Haplothysanus* Attems.
- 7b. Tarsus of gonopod partly beset with spines, hairs, or saw-like teeth, or the margin strongly fringed; tibial process finely furrowed 9.
- 9a. Tibial process with an articulation nearly in the middle. Tarsus of gonopod with cross-keeled ridges, resembling a saw in profile *Harmomastix* Attems.
- 9b. Tibial process not articulated in the middle 10.
- 10a. Tarsus of gonopod with one spine, similar to the tibial spine
(3) *Spinotarsus* Attems.
- 10b. Tarsus of gonopod not spined 11.
- 11a. The fringes of the metasomites are broad, rounded little plates
(4) *Patiniatus* nov. gen.
- 11b. The fringes of the metasomite are tooth-like, with one or several points . 12.
- 12a. Terminal lobe of tarsus of gonopod without spines, saw-teeth, or marginal teeth; basal lobe beset with little spines . (5) *Ardiophyllum* nov. gen.

- 12b. Terminal lobe of tarsus with saw-teeth, spines, or marginal teeth . . . 13.
 13a. Terminal lobe of tarsus of gonopod strongly fringed and lobate only on the margin; no spines on the surface of this lobe (6) *Storthophorus* nov. gen.
 13b. Terminal lobe of tarsus with a row of saw-teeth or with a broad zone of spines or hairs on the surface 14.
 14a. Terminal lobe of tarsus with a single row of strong saw-teeth. No tibial spine *Prionopetalum* Attems.
 14b. Terminal lobe of tarsus with a pad beset with spines or hairs. One tibial spine present (7) *Chaleponcus* Attems.

Gen. ODONTOPYGE Brandt-Attems.

1841. *Spirostreptus* subg. *Odontopyge* Brandt, Rec. I. Mein., p. 187, ex. p.
 1896. *Odontopyge* Attems, Stuhlman's Reise Ostafrika, p. 36, ex. p.
 1909. *Odontopyge* Attems, Zool. Anz., xxxiv, p. 159.
 1909. *Odontopyge* Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 43.
 1914. *Odontopyge* Attems, Afrikan. Spirostrept., p. 182.

Femur of gonopod not spined, with short, blunt stump. Tibial spine generally present. Tibial process rarely with one or more little spines near the tip, long and slender. Tarsus bilobed, the lobes generally of different size. Occasionally the tarsus is long and slender. Six or seven supralabral pits. The fringes of the metasomite generally divided into several points; rarely simple. Fourth and fifth joints of anterior legs padded. Anal valves with thickened margin, without furrow on the inside; the upper end toothed (in *O. sennae* alone it is not toothed). Metasomites smooth dorsally. Intercalar plates of posterior pairs of legs separate. Mandible with 11 dentate lamellae.

Numerous species in East and Central Africa (ten species), Mozambique (one species), West Africa (one species), Erythrea (two species), Sudan (two species), Abyssinia (one species).

Key to the Species of *Odontopyge*.

- 1a. Tibial process of gonopod with one or several lateral spines or teeth
 multiannulata Att., *aloyzii sabaudiae* Silv., *regina* Carl.
 1b. Tibial process without lateral spines or teeth 2.
 2a. Anal valves not spined above *sennae* Bröl.
 2b. Anal valves spined 3.
 3a. No downwardly directed long lappet at tip of gonopod-coxite . . . *tumidens*
 Karsch, *kandti* Carl, *terebrum* Rib., *scaphula* Attems, *severini* Silv.
 3b. Gonopod-coxite with one long basally directed lappet at the tip . . . 4.
 4a. In the middle of the lateral margin of the gonopod-coxite a strong tooth or a hatchet-like process 5.

- 5a. In the middle of the dorsum a broad, light, longitudinal band. Beside the thickening of the anal valve three setiferous papillae. The tip of the tibial process is a spiral *bullata* n. sp.
- 5b. No bright band on the dorsum. No papillae beside the thickening of the anal valves. The tibial process is not spiral 6.
- 6a. On the lateral margin of the coxite a simple spine. 54-57 segments. Width 8 mm. The fringes have several points *kilimandjarona* Att.
- 6b. On the lateral margin of the coxite a hatchet-like process. 62 segments. Width 4-6 mm. The fringes are simple *dolabrata* n. sp.
- 4b. No pointed tooth in the middle of the lateral margin of the gonopod-coxite 7.
- 7a. Tarsus of gonopod very long and narrow, bent on itself in the middle. The distal half parallel to the proximal half *bayoni* Silv.
- 7b. Tarsus of gonopod broader to very broad, never bent into two parallel halves 8.
- 8a. Marginal fringes each divided into several points. Tibial spine large
dispersa Carl., *procera* Att., *punctulata* Att., *intermedia* Carl.
- 8b. Marginal fringes single-pointed. Tibial spine small or wanting 9.
- 9a. Tibial spine wanting; lappet on tip of gonopod very long and narrow. Collum with one arcuate fold. Clypeus roughly wrinkled *ornata* Pet.
- 9b. Tibial spine present. Lappet of gonopod with a broad base, gradually tapering. Collum with two arcuate folds. Clypeus smooth 10.
- 10a. On aboral side of gonopod-coxite one long, pointed lappet beginning at the lateral margin and directed medially. Beginning of distal margin strongly dentate. Distal piece of tarsus of gonopod with a long, tapering lappet. Metasomites shining, the microscopic punctuation scarcely visible
hereronia Attems.
- 10b. On aboral side of gonopod-coxite no long, pointed, medially directed lappet. Tarsus of gonopod rounded, without long, pointed lappet. Metasomites with fine leathery wrinkles, not very smooth and shining 11.
- 11a. 66 segments. Width 6-8 mm. One short, blunt tooth on lateral margin of gonopod-coxite. All legs of ♂ from the third padded *durbanica* Attems.
- 11b. 55-58 segments. Width 4 mm. On lateral side of gonopod-coxite one broad, rounded protuberance and one rounded lamella. Legs behind the gonopods not padded *trifolia* n. sp.

236. *Odontopyge bullata* n. sp.

(Pl. XXIII, figs. 534-537.)

Colour: on the dorsum a yellow median stripe, the rest of the dorsum up to the pores black, the posterior margin of the metasomites reddish-brown, interrupting the longitudinal stripe. The stripe begins on the collum and runs to the apex of the anal segment. The sides and the under-side earth-brown. The anterior half of the head-plate reddish-brown. Antennae and legs brown.

Width 3.4 mm.; 64 segments.

The labral sinus moderately deep. Six supralabral pits. Head smooth. Interocular sulcus not visible. Antennae slender, reaching

the posterior margin of the fourth segment. Anterior angle of collum broadly rounded, not projecting; one curved fold. Metasomites densely covered with short longitudinal furrows and punctures. Upper longitudinal striae remote from the pore. Prosomite with the usual encircling furrows; free part with wrinkles as on the metasomite. The fringes (fig. 534) long, simple, palisade-like points. Sternites smooth. Dorsal angle of anal segment relatively pointed. Thickening of anal valve very fine and low, on its side three large setiferous papillae. The upper spine small, a little papilla on the inferior end of the margin. The scale triangular-pointed. The tibia and postfemur padded on nearly all the legs.

Gonopods (figs. 535-537): the coxites are slender, their ends bent together, divided into one rounded and one hatchet-like lappet; the points of this hatchet somewhat curved. On the medial side a little serrated lappet and a pointed spine; on the lateral side in the middle, a short, stout spine. No basal spine. The tibial process without lateral spines, with small furrows, the end forming a spiral. The tibial spine long and straight. Tarsus consisting of two parts, one short and one boat-like.

Masiene, Chai Chai, Portuguese E. Africa (6005).

237. *Odontopyge dolabrata* n. sp.

(Pl. XXIII, fig. 538; Pl. XXIV, figs. 539-542.)

Colour dark reddish-brown. On the dorsum of the prosomite a yellow transverse spot, distinctly visible only when the animal is curved. Antennae and legs yellowish. The spine of the anal valve yellow, the rest of the anal segment dark.

♂ width 4.6 mm.; 62 segments.

Labral sinus deep; six supralabral pits. Head smooth. Interocular and longitudinal sulcus very fine. Basal joint of mandible projecting in a blunt, bordered prong. Anterior angle of the collum broadly rounded, not projecting; two curved folds. Free part of prosomite and metasomite very finely and regularly wrinkled. Upper abbreviated longitudinal striae on the metasomite somewhat remote from the pore. Transverse suture sharp. The pore before the middle. Circular furrows of prosomite normal. Fringes half as long as the whole border; sharp and simple, forming a regular saw. Sternites smooth. Tibia and postfemur padded on nearly all the legs. Ring part of anal segment with a weak median keel; wrinkled like the metasomites. Thickening of anal valves slight, no furrow

at its side; the spine very long; a small papilla below; scale triangular.

Gonopod: at the tip of the coxite (figs. 540, 541) a long, basally turned lappet lying between two rounded lamellae, one aboral and one oral. In the space between the aboral lamella and the terminal lappet a fourth process. On the lateral side a large, pointed, hatchet-like process. No basal spine; tibial spine short; tibial process without lateral spines. Tarsus divided into two branches, each consisting of several lamellae (figs. 538, 539).

Masiene, Chai Chai, Portuguese E. Africa (6420).

238. *Odontopyge durbanica* Attems.

1914. Attems, Afrikan. Spirostrept., p. 185, pl. x, figs. 197-202.

Colour black; antennae and legs yellow.

♂ width 6.8 mm., robust; 66 segments.

Clypeus smooth. Collum with two complete and two incomplete arcuate folds. Anterior half of prosomite with straight encircling lines; free part of prosomite and the metasomite with fine punctuation and longitudinal fissures, not shining. Marginal fringes simple, pointed. Dorsal process of the anal segment a little compressed laterally; the dorsum therefore bluntly keeled. Fourth and fifth joints of all the legs padded.

Gonopods: one little tooth at the side of the gonopod-coxite. At the tip one large lappet with broad base tapering gradually and directed basally. The lateral lamella ending in a rounded lappet. The medial leaf with one rounded lamelliform process on the inner side, close to the spot where the gonopod telopodite leaves the sheath. This lamella stands straight out distally. Telopodite: the femur with one short, rounded lappet; tibial spine with one little basal tooth. No guiding pin distally to the tarsal spine. Tibial process long, slender, curved several times, without lateral spines. Tarsus totally rounded; the basal piece sends out one hollowed lappet as far as the base of the tibial process; the main distal part is irregularly folded. The distal piece of the tarsus is divided into two rounded lamellae, both broad and curved basally. In fig. 200 of my paper quoted above, the right lobe of the tarsus is the distal piece, the left the basal piece.

Durban, Lourenço Marques.

239. *Odontopyge trifolia* n. sp.

(Pl. XIV, figs. 357, 358 ; Pl. XV, figs. 359-360.)

Colour brown or black, the metasomites bordered with dark reddish-brown ; margin of clypeus, antennae, and legs yellowish.

♂, 55-58 segments ; width 3.9 mm. ; ♀, 4.5 mm.

Clypeus smooth, six or seven supralabral pits. Cheeks of ♂ with a short, blunt lobe. Collum laterally narrowed and broadly rounded, the anterior border straight, not bent forwards at the sides. Two folds, one near the margin, separating a broad border, the second more distant. Encircling striations occupy the first half of the prosomite. Metasomite finely punctate and very densely wrinkled like leather. The pores open in the anterior third. The fringes are simple little teeth, the whole resembling a fine saw. Internally the border is indistinctly striated longitudinally (fig. 359). Thickening of anal valves small, the upper end strongly toothed, on the lower end no distinct papilla. The pads of the anterior legs somewhat indistinct, the legs behind the seventh segment not padded.

Gonopods : in the middle of the lateral margin of the gonopod-coxite (fig. 357) a rounded transverse lobe (*l*) ; basally to it a rounded lamella (fig. 360). Tip complicated by various folded lamellae forming a deep groove. Close to this groove is a rounded lamella directed straight upwards. The tip bears a long spine or lobe (*T2*) directed downwards (to the base). On the femur of the gonopod (fig. 358) one short, rounded lobe (*fl*) instead of the spine. One small simple-pointed tibial spine (*Ts*) ; distally to this spine one blunt guiding pin (*f*). Tibial process long, finely striated, without lateral spines, describing a large S. Tarsus consisting of two pieces, the basal piece itself divided into two large lobes (*Ba* and *Bb*). A remarkable thumb-like process (*d*), whose margin passes into a little hollowed lamella with dentate margin ; a transition to the characteristic plate of *Storthophorus*. The distal piece of the tarsus (*D*) is one broad band rounded and curved at the tip.

Colesberg (23392).

240. *Odontopyge hereronia* Attems.

1922. Attems, Myriopoda in Michaelsen's Beitr. z. K. Land- und Süsswasserfauna D. S.W. Afrikas, Ergebn. Hamb. Wiss. Studienreise, 1911. Bd. 2, Lf. 1, p. 101, fig. 2.

Colour black ; antennae and legs yellow ; the antennae blackish at the tip.

Width 4.5 mm. ; 60 segments.

Labral sinus deep, semicircular, five supralabral pits. Clypeus not wrinkled, but finely punctate. The proportions of the eyes and furrows on the vertex the same as in the allied species. Sides of collum broad, not much narrowed, lateral margin nearly straight, anterior angle broadly rounded. Two arcuate folds. Covered part of prosomite with numerous encircling lines, running straight as far as the sternite. Free part of prosomite and whole metasomite with microscopically fine punctuation, smooth and shining. Transverse suture sharply defined. Sternites with fine reticulation, not striated. Stigmata normal. Anal segment with weakly compressed dorsal angle ; the valve slightly arched, spined above, the margination small and fine. Fourth and fifth joints of all the legs to the last pair padded. Free points of marginal fringes as long as half the whole margin. They are simple, forming a fine regular saw ; each tooth with dark convergent lines.

Gonopods : at the tip of the gonopod-coxite one large basally directed lappet, broad at the base and gradually tapering. On the aboral side another large, pointed lappet rising from the lateral margin and directed towards the median line. The margin at the transition of the two lappets dentate. On the oral side the medial leaf sends out one rounded lamella straight distally to the cavity formed by the terminal lobes. The same lamella is present in *O. durbanica* and *O. trifolia*. Femur of gonopod with one short, rounded lappet. The little tibial spine with one small basal tooth ; distally to the tibial spine one short, rounded guiding pin. Tibial process long and slender, describing several curves like an 8, without lateral spines. The distal half is finely striated. On the tarsus we can discern two portions, the basal piece and the distal piece. The basal piece is weaker than in the allied species ; it sends out one hollowed lamella to the base of the tibial process. The distal piece ends with one long, pointed, gradually tapering lappet. The tarsus of this species is somewhat different in its outline, but the individual parts are the same as in *O. durbanica* and *O. trifolia*.

Usakos, S.W. Africa (Michaelsen coll.).

The three South African species of *Odontopyge* form a little group much more nearly related to one another than to the remaining species of the genus. It seems likely that *O. hereronia* is the western, *O. trifolia* the central, and *O. durbanica* the eastern form ; but as they are all recorded on single captures we do not know as yet the true area of each species.

Gen. HAPLOTHYSANUS Attems.

1909. Attems, Zool. Anz., xxxiv, p. 158.

1909. Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 48.

1914. Attems, Afrikan. Spirostrept., p. 189.

Femur of gonopod with one, generally long, spine. Tibial spine present or wanting. Tibial process slender, moderately long or long; rarely with a small spine on the distal half, or with a little barb or a little lobe at the tip. Tarsus broad, leaf-like. Six, rarely eight, supralabral pits. The fringes of the metasomite simple-pointed. Prosomites with concentric striations. Metasomites generally smooth dorsally, with shallow longitudinal grooves in two species. Anal valves toothed on the upper side, the thickening generally rising gradually, rarely accompanied by a groove on the lateral side with three setiferous papillae. Rarely a furrow on the inner side. Intercalar plates of the third pair of legs coalesced. Mandible with 8-11 comb lamellae. Tooth lamella with four teeth. Fourth and fifth joints of anterior legs padded.

The species hitherto known live in East and Central Africa (eleven species), Zanzibar (one species), Sudan (one species), Somaliland (one species). The two species described here are related to *latifolius* from East Africa. The differences between the three species are apparent in the following synopsis:—

Key to the South African Species of Haplothysanus.

- 1a. Width 10 mm. Sides of collum projecting forwards in a broad, rounded lobe. Some longitudinal furrows are present on the metasomite above the pore *colosseus* n. sp.
- 1b. Width 3·2-5·4 mm. Sides of collum not projecting. No longitudinal furrows above the pore 2.
- 2a. Telopodite of the gonopod without tibial spine. 51 segments. In the middle of the dorsum one broad black band, the sides a pretty brick colour. Only the fifth joint of the legs padded. (East Africa) . . . *latifolius* Att.
- 2b. Tibial spine present. 60-67 segments. The dorsum without longitudinal bands or one bright longitudinal band in the middle; fourth and fifth joints of legs padded. (South Africa) 3.
- 3a. Somites indistinctly cross-banded; in the median line two little bright spots, one on the prosomite, one in the transverse suture. 60 segments. At the tip of the coxite of the gonopods one large lappet on the lateral side. No basally directed tooth on the medial side *serratus* n. sp.
- 3b. In the middle of the dorsum one wide yellow longitudinal band. 66-67 segments. Coxite of the gonopod without lappet on the lateral side. On the medial side one large tooth, directed towards the base . . . *modestus* n. sp.

241. *Haplothysanus serratus* n. sp.

(Pl. XV, figs. 364-366.)

Somites dark, slate-coloured, bordered with dark reddish-brown; in the middle of the prosomite and metasomite a little yellow spot. These spots are absent on the first segments and indistinct on the last. Anterior part of clypeus, antennae, and legs dark reddish-brown.

♂, 60 segments. Width 3.2 mm.

Clypeus smooth. I noted only four supralabral pits. Sides of collum broadly rounded; sides of anterior margin not bent forwards. The sides convex. One fold parallel to the lateral margin, and at some distance one oblique fold. Anterior half of prosomite with concentric striations. The upper complete longitudinal furrows of the metasomite distant from the pore. Very short furrows on the suture between the last complete furrow and the pore. Metasomites on the dorsum with short, very shallow, longitudinal grooves, not punctate or striate, apparently nearly smooth. The pores open far from the suture on the anterior segments; on the posterior segments they open in the middle.

Margin of anal valves not thickened, toothed on the upper side. No papilla on the inferior end. Scale sharply triangular. The angle of the dorsal margin is somewhat compressed but not keeled. Sternites smooth. The fourth and fifth joints of all the legs are padded. Fringes like a fine saw, the teeth simple and pointed (fig. 366).

Gonopod-coxite (fig. 364) relatively slender, on the outer side of the end an irregular hatchet-like lobe (*l*). No prominence on the lateral margin. At the tip of the medial leaf one large, rounded lobe. A deep sinus between the blunt tooth of the lateral leaf and the terminal lobe. Femoral spine (*Fd*) of the gonopod (fig. 365) long and slender, strongly curved. Tibial spine (*Td*) very large and strong. The tibial process describes several winding curves; no lateral spine. The lobes of the tarsus (*Ta*) large, broadly rounded.

Komatipoort, Eastern Transvaal (B. 4045).

242. *Haplothysanus modestus* n. sp.

(Pl. XXIV, figs. 543-545.)

Colour black, with a broad reddish band beginning on the collum and running to the apex of the anal segment. In the posterior half of the prosomite and in the anterior half of the metasomite, on the

dorsum of each segment, a yellowish spot crossing the longitudinal band. Antennae brown, legs yellowish-brown.

♂ width 4.5 mm. ; 66–67 segments.

Head smooth ; seven supralabral pits ; labral sinus moderately deep. Anterior angle of collum broadly rounded, not projecting ; two strong, curved folds. Free part of prosomite and whole metasomite covered with minute and regular longitudinal wrinkles. The upper complete longitudinal striae of the metasomite far from the pore. No striae on the dorsum ; pore small, far from the transverse suture ; the suture sharply defined, not sensibly curved before the pore. Punctate encircling furrows of prosomite normal. Anal segment wrinkled like the metasomites. Marginal thickening of valves of moderate size ; no furrow on lateral side. The spine strong ; no papilla on the inferior end of the thickening. Scale triangular. Sternites smooth. The fringes on the posterior border of the metasomite are composed of strong, simple points.

Gonopods (fig. 543) : tip of coxite blunt and rounded ; its medial border bears a little hook, separated by a sinus from the tooth on the end of the lateral leaf. Medial leaf with a rounded lappet near the tip. No process on the lateral side (fig. 544). Basal spine a spiral. Tibial process without lateral spine. Tibial spine large, weakly curved. Tarsus composed of large lamellae (see fig. 545).

Masiene, Chai Chai, Portuguese E. Africa (6014, 6032).

243. *Haplothysanus colosseus* n. sp.

(Pl. XV, figs. 361–363.)

Colour slate-grey ; narrow border of metasomites dark reddish-brown ; antennae and legs dark brown.

♂, 64–65 segments (approximately ; no specimen in the bottle being entire).

Clypeus wrinkled. 1+2+2+1 supralabral pits, the lateral ones more distant. Ocelli distinctly convex. Sides of collum projecting forwards, with a broadly rounded lobe. Marginal border small ; one fold parallel to the marginal furrow, the second at some distance from it, both comparatively weak. The encircling striations occupy more than the first half of the prosomite ; rest of prosomite finely wrinkled and punctate. Metasomites very densely and coarsely punctate. Some longitudinal furrows above the pore, generally abbreviated. Pores at junction of anterior and middle thirds. Suture scarcely bent in front of pore. Somites not constricted at the transverse

suture, the suture distinct. Angle of anal segment laterally compressed and bluntly keeled. Anal valves with very small, thickened border; small hairs are situated directly on this border, not on papillae. One tooth on the upper side of the valves. No papilla on the inferior end. Scale raised. Sternites smooth. Fourth and fifth joints of third to last pairs of legs padded. Fringes short and with little pointed teeth (fig. 363).

Gonopods: on the lateral margin of the gonopod-coxite (fig. 362) in the distal half a very large, broadly rounded process (*b*); at the tip a slender outwardly directed cone (*l*). Medial leaf rounded, without lobes and not projecting much. Tip of lateral leaf divided by a deep sinus into a broad, rounded lobe and a blunt tooth. Femoral spine (*Td*) of gonopod (fig. 361) very long and strongly curved. No distal spine. Tibial process without lateral spines. Tarsus a broad, rounded structure, whose margins are irregularly lobed.

Twenty miles east of Pietersburg, Zoutpansberg Div., Transvaal (7492).

Gen. SPINOTARSUS Attems.

1909. Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 51.

1909. Attems, Schultze's Forsch. Reise, p. 46.

1914. Attems, Afrikan. Spirostrept., p. 200.

Femoral spine of gonopod long. Tibial spine generally present (absent in *S. lineatus*). Tibial process with fine, oblique striae, without lateral spines. Tarsus with a strong, pointed spine. Tarsus consisting of a broad transverse basal lobe, generally partly beset with little spinules, and a long and slender distal lobe, without hairs, spines, or saw-teeth, sometimes with little scales. Six or four supralabral pits. Marginal fringes generally with single points, rarely divided into several points. Anal valves toothed on the upper side or not toothed. The legs of the ♂ are padded or not. Small and slender species.

Distribution.—British East Africa, Central Africa, Kalahari, South Africa.

Key to the Species of *Spinotarsus*.

- | | |
|--|-------------------------------|
| 1a. Anal valves toothed on upper side | 2. |
| 2a. Gonopod without a tibial spine. Basal lobe of gonopod-tarsus smooth. Distal lobe partly beset with little scales | <i>lineatus</i> n. sp. |
| 2b. Gonopod with a tibial spine | 3. |
| 3a. Basal lobe of gonopod-tarsus without hairs or spinules | <i>robustus</i> n. sp. |
| 3b. Basal lobe of gonopod-tarsus with little spinules | 4. |
| 4a. Fringes of metasomite divided into several points. Four supralabral pits. Dorsum without light median band | <i>verneri</i> Att. (Uganda). |

- 4b. Fringes of metasomite simple. Six supralabral pits 5.
- 5a. Dorsum without light median band. ♂ width 2·6 mm. Tarsus of posterior gonopod partly with scale structure. One tooth on lateral margin of gonopod-coxite *striolatus* n. sp.
- 5b. Dorsum with yellow median band. ♂ width up to 1·5 mm. Tarsus of gonopod without scale structure. No tooth on lateral margin of gonopod-coxite 6.
- 6a. ♂, 35 segments. Medial leaf of gonopod-coxite broadly rounded at tip. Terminal lobe of tarsus of gonopod broader and less curved *xanthonotus* Attems.
- 6b. ♂, 63 segments. Tip of medial leaf of gonopod-coxite with one pointed lappet and one thick, basally directed tooth, separated by a narrow sinus. Terminal lobe of tarsus of gonopod smaller and bent on itself . . . *tenuis* n. sp.
- 1b. Anal valves not toothed 7.
- 7a. One strong tooth in middle of lateral margin of gonopod-coxite, directed distally. (Dorsum with yellow longitudinal band)
laticollis Carl (Central Africa).
- 7b. Lateral margin of gonopod-coxite not toothed 8.
- 8a. Dorsum without yellow median band; anterior legs (pairs 2-7) not padded. Seventh pair of legs of ♂ normal. Anal scale raised. 55 segments
castaneus Attems.
- 8b. Dorsum with yellow median band. Anterior and middle pairs of legs of ♂ padded. Two basal joints of seventh leg of ♂ incrassate, the following joints abruptly narrowed. Anal scale with straight border. 72 segments
voiensis Rib. (British East Africa).

244. *Spinotarsus lineatus* n. sp.

(Pl. XX, figs. 498-500.)

Colour dark chestnut; on the middle of the dorsum a small longitudinal yellow band beginning on the third segment and extending as far as the anal segment. Antennae dark brown, legs and ventral side yellowish.

♂, 50 segments. Width 2·4 mm.

Head-plate smooth, labral sinus moderately deep, rounded; six supralabral pits. Cheeks of ♂ quadrate, the border thickened. Collum not much narrowed laterally; one strong curved fold and one abbreviated fold. Exposed part of somites with very fine and short longitudinal striae; metasomites longitudinally furrowed only on the ventral side. Pores opening before the middle. Transverse suture fine, sharply defined. Marginal fringes simple. Anal valves with a low marginal thickening, separated by a weak groove from the lateral surface; upper end of marginal thickening sharp and ending in a small, strong tooth. Dorsal prominence of anal segment laterally compressed. Sternites microscopically striated transversely. Legs, except on the last 10 segments, padded.

Gonopods: on medial side of gonopod-coxite (figs. 498-499) a large broadly rounded lobe (*l*) and two little processes separated by a rounded sinus, one process directed distally, the second basally. On the lateral margin a short, strong, dark-coloured tooth (*z*). Tip of gonopod-coxite broadly rounded and a short, rounded lobe is bent on itself basally. Femoral spine of gonopod (fig. 500) long and slender, at its origin directed distally, then bent and directed basally, not twisted round the gonopod. No tibial spine. By this character the species is distinguishable from all other species of *Spinotarsus*. Tibial process long and slender, obliquely striated, the tip curved. Tarsus with a strong, pointed spine. Basal lobe broad, simple, without hairs or spines. Distal lobe long and slender, a long compressed lamella, forming a complete circle. Surface partly beset with little scales.

Kei Road, Cape Province (B. 829).

245. *Spinotarsus robustus* n. sp.

(Pl. XXIV, figs. 546, 547; Pl. XXV, fig. 548.)

Colour: on the dorsum a yellowish longitudinal band, beginning on the collum and running to the penultimate segment, the yellow interrupted by darker brown spots. Sides of dorsum to the pores dark brown, beneath the pores yellowish-brown, with darker spots. Antennae and legs brownish. Anal segment and head dark brown.

♂ width 2 mm.; 57 segments; not very slender.

Clypeus smooth; six supralabral pits. Interocular sulcus indistinct, longitudinal sulcus weak. Inner corner of eyes surpassed by the base of the antenna. Collum laterally scarcely narrowed, the anterior corner broadly rounded. The last space between the circular furrows of the prosomite very wide, covered with a microscopical network. Metasomite very densely covered with fine and short longitudinal striae. The complete longitudinal furrows end far from the pore. Pores nearer to the transverse suture. Fringes on posterior border composed of short, pointed, simple teeth. Anal valves moderately vaulted; marginal border very small, laterally not sharply defined, with a short tooth on the upper end and without papilla on the inferior end. The scale arched and pointed. Sternites smooth, with microscopic transverse striae. Fourth and fifth joints of nearly all legs padded.

Gonopods: on the inner border of the coxa (figs. 547, 548) near the tip two teeth, one terminal hook and one straight tooth, the latter in connection with a rounded lamella directed outwardly. Between

the two teeth a short and blunt pin. No process on the lateral border of the coxa. Praefemoral spine of telopodite (fig. 546) a long spiral, twisted round the tibia. Tibial process long, without lateral teeth. Tibial spine long, sensibly longer than in *Spinotarsus tenuis* and *xanthonotus*. Tarsal spine on the opposite side slender and longer than the tibial spine. Basal lobe of tarsus without hairs (differing in this from all other species of the genus except *lineatus*), the distal lobe ending in two strong, divergent points.

Masiene, Chai Chai, Portuguese E. Africa (6010).

246. *Spinotarsus striolatus* n. sp.

(Pl. XV, figs. 371-373.)

Colour dark brown, broad border of metasomites reddish-brown; therefore annulated, but not conspicuously. Antennae dark brown, legs yellowish-brown.

♂, 65 segments; width 2.6 mm.; ♀, 2.8 mm.

Head very smooth and shining. Six supralabral pits. Sides of collum broadly rounded. Anterior part of prosomite with the usual encircling striation. Visible part of prosomite and whole metasomite with short, fine, and sharp longitudinal striae. Longitudinal furrows on metasomites distant from the pore on the anterior segments; confined to the ventral surface on the posterior segments. Above the complete furrows some abbreviated furrows at the sides. Transverse suture well developed, the somites not constricted at the suture. Pores opening in the middle third. The boundaries of the elements of the fringes are very distinctly visible to the base of the whole border; they are coalesced in the greater part of their length, the free ends are blunt. The whole appears as if composed of knife blades lying close together (fig. 373). Sternites smooth. Stigmata normal, small and triangular. Dorsal margin of anal segment angulate; the angle laterally compressed but not keeled. Valves normally toothed; the inner margin not thickened, with four bristles. Anal scale arched and pointed. Anterior and posterior legs padded on the fourth and fifth joints.

Gonopods (figs. 371, 372): no lateral lobe at tip of gonopod-coxite. In the middle on the lateral side one thick, blunt, dark-coloured tooth (*b*). Medial and lateral leaf broadly rounded at the tip. Femoral spine of gonopod very long, curved to the base and pointed. Tibial process strongly curved, slender, without lateral spines. Tarsus relatively long, narrow, and strongly curved, describing nearly a

complete circle; its surface partly covered with little scales. One pointed tarsal spine (*Tad*) present.

Merebank, Natal (150184); Kei Road, Cape Province (B. 829).

247. *Spinotarsus xanthonotus* Attems.

1909. Attems, L. Schultze's Forsch. Reise S.W. Africa, p. 47.

Kalahari, Lookaneng-Severelela (Schultze), Windhoek and Farm Paulinenhof, near Windhoek (Michaelsen).

248. *Spinotarsus tenuis* n. sp.

(Pl. XV, figs. 367-370.)

Colour: middle of dorsum occupied by one broad yellow band, its commencement pointed on the collum and running as far as the point of the anal segment. Sides blackish-brown; ventral surface yellowish. Antennae blackish-brown, legs yellowish.

♂, 63 segments. Width 1.5 mm.; very slender.

Clypeus very smooth, labral sinus shallow; six supralabral pits. Cheeks of ♂ with broad, rounded lobe. Collum narrowed at the sides, anterior angle broadly rounded, not projecting, the margin finely bordered; one curved fold. Free part of somites with very fine and shallow, short longitudinal striae. The complete longitudinal furrows on the metasomite end far from the pore; they are continued by short furrows on the suture to the pore. Pores in advance of the middle. The elements of the narrow, fringed border are free from the middle of their length; they are sharply pointed; between two points one broad, rounded sinus (fig. 370). Sternites very finely striated transversely. Anal valves with small sharply defined marginal border, toothed on the upper side. Dorsal margin of anal segment with blunt angle. The scale arched. Anterior and middle pairs of legs padded.

Gonopods: at tip of gonopod-coxite one pointed lappet directed distally and one blunt tooth directed basally, the two separated by a broad shallow sinus. Inner margin of lateral leaf bearing one sharp tooth (*g*) directed basally and one rounded lobe (*h*) as in *S. xanthonotus* (figs. 367-368). Femoral spine (*Td*) long, twisted round the femur. Tibial spine (*Td*) strong. Tibial process (*tf*) long and slender, finely furrowed, curved several times. Tarsus bearing a strong spine (*Tad*, fig. 368) on the side opposite to the tibial spine. Basal lobe of tarsus truncate, its margin covered with dense, fine hairs (fig. 369). Terminal lobe of tarsus hollowed and describing two curves.

Messina, N. Transvaal (B. 4069).

249. *Spinotarsus castaneus* Attems.

1909. Attems, L. Schultze's Forsch. Reise S.W. Africa, p. 49.
Kalahari, Lookaneng-Severelela.

Gen. PATINATIUS nov.

Gonopod: telopodite without femoral or tibial spine. Tibial process relatively short, finely furrowed. Basal lobe of tarsus with entire margins; terminal lobe broad, hollowed, with a row of saw-teeth in the hollow. No tarsal spine.

The fringes of the metasomites are broad, rounded plates, with fine longitudinal striation. Prosomites with the usual concentric striations on the covered parts. Metasomites without special sculpture, as in allied genera. Six supralabral pits. Anal valves not toothed. Anterior and posterior legs padded.

250. *Patinatius inermis* n. sp.

(Pl. XV, figs. 374-376.)

Colour earthy-brown or reddish-brown, legs yellowish.

♂, 55 segments. Width 2 mm.

Head smooth; six supralabral pits. Inner angle of eyes a little further back than base of antennae, moderately pointed. The ocelli distinctly convex. Antennae relatively long, reaching posterior border of fifth segment. Cheeks of ♂ with rounded lobe. Sides of collum moderately narrowed and straight, anterior corner not projecting, posterior margin straight. Two strong curved folds. Encircling striations on the prosomite few in number and very fine. Transverse suture distinct. Metasomites dorsally with fine longitudinal needle-like fissures; the longitudinal furrows confined to the ventral surface. Pores in the middle of the metasomite. Sternites with fine transverse striations. Dorsal margin of anal segment angular; the valves moderately curved, the margin with narrow but high thickened border accompanied on the outer side by one deep irregular groove; upper end not toothed. Anal scale arched.

The fringes of the metasomite (fig. 376) are very peculiar, consisting of broad, rounded plates, somewhat enlarged at the tip. They have longitudinal stripes. Probably each plate represents a coalescence of several smaller fringe elements.

Gonopods (fig. 374): at the tip of the gonopod-coxite one long, pointed, curved spine or lobe (*T*) directed basally. No tooth or prominence on lateral margin. Gonopod telopodite without femoral or tibial spine. Tibial process (*Tf*) relatively broad and short and bent like a sickle, not describing several circles as in allied genera; distal half with fine oblique striae. Tarsus with several small, simply rounded lobes and one large boat-shaped terminal lobe. In the hollow of this lobe is one ridge beset with little, pointed teeth (fig. 375).

Hanover, Cape Province (2327).

Gen. *ARDIOPHYLLUM* nov.

Gonopod: femoral spine present, tibial spine present or absent. Tibial process with fine furrows, without lateral spines. Tarsus with a well-developed basal lobe partly beset with little spinules; terminal lobe smooth, without spines, hairs, or marginal fringes. No tarsal spine; one species with the rudiment of such a spine in the form of a short, rounded lobe.

Fringes of metasomite made up of simple, small, pointed teeth. Six supralabral pits. Prosomites with the usual concentric striations. Anal valves toothed on the upper side. Fourth and fifth joints of anterior and middle pairs of legs of ♂ padded.

Key to the Species of Ardiophyllum.

- 1a. Dorsum with one yellow longitudinal band. Gonopod with strong tibial spine. At the tip of the gonopod-coxite only one blunt, short lobe directed basally *matabelinum* n. sp.
- 1b. Annulated, without any yellow longitudinal band 2.
- 2a No tibial spine on the gonopod; at the tip of the gonopod-coxite one short, broad lobe, directed basally. Metasomites strongly punctate and with short longitudinal furrows. 67-69 segments *debile* n. sp.
- 2b. Tibial spine of gonopod present; at the tip of the gonopod-coxite one long, pointed lobe, directed basally. Punctuation of the metasomites very weak. 63 segments *liberale* n. sp.

251. *Ardiophyllum matabelinum* n. sp.

(Pl. XV, figs. 382-384; Pl. XVI, fig. 385.)

Colour blackish-brown; a moderately broad, yellow, longitudinal band beginning on the collum and running to the apex of the anal segment; legs yellowish-brown.

♂, 61 segments. Width: ♂, 2 mm.; ♀, 2.8 mm.

Clypeus smooth, labral sinus shallow; six supralabral pits. Cheeks with a blunt lobe. Anterior margin of collum bent forwards a little at the sides, anterior angle broadly rounded and finely bordered. Two arched folds. Anterior part of prosomite with the usual concentric striations. Transverse suture distinct; on the dorsum little pits close to the suture, continuing the longitudinal furrows of the ventral surface. Furrows at the sides below the pore abbreviated. Dorsum of metasomites with very fine and inconspicuous needle-like fissures. Fringed border of the metasomite narrow; the free points form one minute fine saw. Dorsal margin of anal segment angled, the angle laterally compressed but not keeled. Whole anal segment weakly punctate and wrinkled. Anal valves with small and low marginal thickening, with three bristles; toothed on the upper side. Anal scale arched. Anterior and middle pairs of legs of ♂ padded. The seventh pair a little weaker than the sixth (fig. 383).

Gonopods: gonopod-coxite (figs. 382-385) terminated by one pointed lappet; medial leaf bluntly lobed at the tip. One short, broad, and blunt lobe (*Tz*) is directed basally; the lateral leaf projects as a rounded lobe (*h*) distally to the knee of the gonopod telopodite. No tooth on the lateral margin. Gonopod telopodite with one strong femoral spine (*Fd*) and tibial spine (*Td*). Tibial process (*Tf*) finely furrowed, describing several circles, without lateral spines. Tarsus large and broad and divided into two lobes; the basal half of one of them is bent on itself and beset on the margin with little spinules (fig. 385). A broad, rounded, low lamella represents the tarsal spine of *Spinotarsus*.

Bulawayo, Matabeleland (7456).

252. *Ardiophyllum debile* n. sp.

(Pl. XV, figs. 377-378.)

Colour blackish-brown, with broad reddish-brown border, therefore annulated. Antennae, legs, and anterior part of the head yellowish-brown.

♂, 67-69 segments. Width 3.3 mm.

Head smooth; six supralabral pits. Cheeks of ♂ not lobate. Sides of the collum broadly rounded, not projecting, one arched fold. Prosomites with the usual concentric striations, otherwise smooth. Metasomites densely punctate; some of the punctures become short longitudinal fissures. Longitudinal furrows confined to the ventral

surface. Transverse suture well developed, not visibly bent forwards before the pore, which opens near the middle of the metasomite. Fringes of metasomites composed of little pointed teeth, the whole forming a fine saw. Sternites smooth. Dorsal margin of anal segment angled and laterally compressed, but not keeled. Margin of anal valves not thickened, the valves not much raised. The upper side toothed. Anal scale arched. The whole anal segment densely punctate. Anterior and middle pairs of legs of ♂ padded.

Gonopods: one short, broad lobe (*TZ*) bent down on itself at tip of gonopod-coxite (fig. 378); on distal half of lateral margin one moderately strong, rounded transverse prominence. Medial leaf not bent against the sides. Lateral leaf terminated by a blunt triangular tooth. Gonopod telopodite (fig. 377) with strong femoral spine twisted round its axis. No tibial spine. Tibial process, without lateral spines, describes several curves. Tarsus divided into several rounded lobes; the basal (*Tabl*) one beset with fine spinules on the surface and especially on the margin. Lobes of terminal part of tarsus smooth, bearing no spines or fringes.

Howick, Natal (23376).

253. *Ardiophyllum liberale* n. sp.

(Pl. XV, figs. 379-381.)

Colour dark brown, posterior border of metasomite reddish-brown. Antennae yellowish-brown; legs dark reddish-brown.

♂, 63 segments. Width 4 mm.

Clypeus wrinkled and roughened and the six supralabral pits somewhat indistinct. Rest of head smooth; inner angle of eye not visibly surpassing the base of the antennae. Interocular line weak and indistinct. Vertex line very weak. Ocelli distinctly convex. Cheeks of ♂ not lobate, rhomboid in profile. Sides of collum broad, rounded anteriorly, bluntly angled posteriorly; anterior and lateral margin finely bordered. One strong fold separating off a ridge larger than this marginal border; at some distance a second fold. Concentric striations on the prosomite very fine and weak. Metasomites with very fine and weak short longitudinal fissures, visible only with a high-power lens. Complete longitudinal furrows of the metasomite only on the ventral surface; between them and the pore short striae on the suture. Suture well developed, somites not constricted at the suture; pores at junction of anterior

and middle thirds. The suture bent slightly forwards before the pore.

Sternites smooth; the pores small and triangular. Dorsal angle of anal segment laterally compressed but rounded, not keeled. Anal valves with small, well-defined marginal thickening; three bristles, toothed at the upper end, bearing a little papilla at the lower end. Fourth and fifth joints of legs of ♂ padded. Fringe of metasomite (fig. 381) composed of simple little teeth, rather blunt.

Gonopods: at tip of gonopod-coxite one long, straight, tapering spine (TZ) bent downwards on itself, separated by a deep sinus from the blunt tooth (*h*) at the end of the lateral leaf. Medial leaf projecting inwardly as a rounded lobe; its margin not bent outwards on itself. Lateral side of gonopod-coxite a blunt angle, bearing a short black tooth (*l*) on the apex (fig. 380). Femoral spine of gonopod strong, straight, and directed towards the praefemur in the distal two-thirds. Tibial spine strong and pointed. Tibial process simple, without lateral spines, describing several windings. Basal lobe of tarsus partly covered with fine spinules; terminal part divided into several lobes by a deep sinus; no spined or toothed ridge in the terminal lobes (fig. 379).

Vryburg (13754).

Gen. STORTHOPHORUS nov.

Femoral spine of gonopod present or absent. Tibial spine present or absent. Tibial process simple, long, curved, without lateral spines, finely furrowed. Basal lobe of tarsus smooth or beset with fine spinules. Margins of terminal lobe strongly denticulate or fringed. At tip of gonopod-coxite one spine or lobe directed to the base, usually one short tooth on the lateral margin.

Anterior part of prosomites with the usual concentric striations. Six supralabral pits. Margins of anal valves with small thickening, toothed on the dorsal end. Fringes of the metasomite consisting of simple teeth, forming a fine saw.

The gonopod-coxites of *S. delagoanus* are very similar to those of *Odontopyge durbanica*, but the latter has no denticulate and fringed lobe on the tarsus of the gonopod. The fine hairy basal lobe of the tarsus is also found in *Ardiophyllum liberale* and *debile* and in *Spinotarsus*, and is indicated in *Odontopyge trifolia*. This species *O. trifolia* is therefore intermediate between *Storthophorus* and *Odontopyge*.

255. *Storthophorus denticulatus* n. sp.

(Pl. XVI, figs. 393-396.)

Colour dark reddish-brown, posterior border of metasomites chestnut.

♂, 53-55 segments. Width 3.7 mm.

Clypeus smooth; six supralabral pits, the outer ones not distant laterally. Sides of collum bordered; one fold parallel and close to the marginal furrow, the second at some distance; one abbreviated fold between the two complete folds. Free part of prosomite and the metasomite with very weak punctures and wrinkles. Transverse suture well developed, the somites not constricted at the suture. Pores opening at junction of anterior and middle thirds, nearer to the middle on the posterior segments. The suture imperceptibly bent forwards before the pore. Upper longitudinal furrows distant from the pore. Sternites smooth. Stigmata normal. Dorsal angle of anal segment laterally compressed, rounded above. Marginal thickening of anal valves weak, with three bristles; dorsal end toothed. Anal scale arched. Fourth and fifth joints of legs padded.

Gonopod-coxite (figs. 393, 394) characteristically shaped and easily recognisable. Lateral side forming a blunt angle, the distal branch of this angle strongly toothed. At the apex one thick, conical, black tooth (*l*) directed inwardly. Margin of medial leaf sharply toothed and ending in a long, slender, slightly curved spine bent outwards (*t*, fig. 393). On the aboral side a long slender lobe or spine (*TZ*) directed basally and separated by a deep sinus from the terminal lobe of the lateral leaf. The great femoral spine of the gonopod (fig. 395) is twisted round the femur. Tibial spine large and straight (not visible in the drawing as it is situated on the opposite side); tibial process simple, without lateral spines, describing several curves. On the tarsus one lobe with folded margins, but without spines or hairs. Terminal lobe boat-shaped; two delicate lamellae with partly denticulate margins lie upon it (fig. 396).

Krugersdorp, Transvaal (22405).

256. *Storthophorus levifrons* n. sp.

(Pl. XVI, figs. 390-392.)

Colour: prosomite and anterior half of metasomite pale reddish-brown, posterior half of metasomite dark chestnut; the trunk therefore distinctly annulated. Head yellow, band between eyes darkish.

(This band is straight-bordered behind and lobate in the fore part.)
Antennae and legs brownish.

♂, 68 segments. Width 4.6 mm.

Head very smooth and shining; 1+4+1 supralabral pits; the outer one more laterally situated. Cheeks of ♂ with rounded lobe. Sides of collum broadly rounded, lateral fold weak, second fold arched. Sculpture of somites without peculiarities: prosomite with the usual concentric striations. Free part of prosomite and metasomite densely covered with fine punctures and short longitudinal fissures. Upper longitudinal furrow on the metasomite of the sixth segment distant from the pore. Fringes simple, teeth pointed; the teeth free for one-third of the width of the border; no boundaries visible in the coalesced part of the border. Angle of dorsal margin of anal segment laterally compressed, rounded above. Medial border of anal valves finely bordered, bearing three bristles not arising from papilla. Upper end toothed. Anal scale arched. Fourth and fifth joints of legs, including the posterior ones, padded.

The lateral leaf of the gonopod-coxite (fig. 392) with a deep, rounded sinus near the tip, separating a blunt triangular lobe from the lobe directed basally (*TZ*); this lobe has a peculiar torpedo-like shape, attached by means of a thin handle. At the tip a slender lobe rounded and directed obliquely inwards and upwards. The medial leaf but little bent on itself outwardly. At the side a little conical tooth (*l*).

Gonopod (fig. 390) with a large femoral spine, twisted; tibial spine (*Td*) very large and strong, with two lateral teeth. Tibial process simple, describing several curves; the distal half with fine spiral furrows. Tarsus divided into one basal lobe, in part finely spined, and one terminal lobe; the latter long and narrow and with several strongly toothed ridges (fig. 391).

Port St. Johns, Cape Province (23400).

257. *Storthophorus vallatus* n. sp.

(Pl. XVI, figs. 386-389.)

Colour brown, posterior border of metasomites dark chestnut; thus annulated.

♂, 60 segments. Width 2.8 mm.

Clypeus smooth; the labral sinus blunt, triangular. Five supralabral pits. Cheeks of ♂ with rounded lobe. Antennae surpass the fourth segment. Prosomite with the usual regular concentric striations; free part of prosomite and the metasomite with dense,

needle-like fissures. Pores before the middle. Fringes resembling a palisade; the free points occupy one-quarter of the whole border width, three-quarters being coalesced, the boundaries visible (fig. 389). Sternites finely reticulate. Dorsal angle of anal segment laterally compressed, bluntly keeled above. Anal scale arched; valves moderately vaulted; marginal border small, toothed on the dorsal end, and with a little papilla below. Anterior legs of ♂ indistinctly padded, posterior legs not padded.

Tip of gonopod-coxite (figs. 386, 387) pointed. Distal lobe (*h*) of lateral leaf separated by a rounded sinus from the little tooth (*TZ*), basally directed and rising from the pointed terminal lobe. On the lateral margin one blunt tooth (*l*). Femoral spine of gonopod peculiar; a small soft tube broken at several places, not rigid as usual. No tibial spine; tibial process long, slender, without lateral spines, with fine furrows in the distal half (fig. 388). Tarsus divided into several lobes; the terminal one very long and narrow, with its margin partly beset with sharp teeth and obliquely furrowed. The other lobes broad, rounded (figs. 386, 387).

Grahamstown, Cape Province (23386).

Gen. CHALEPONCUS Attems.

1914. Attems, *Afrikan. Spirostrept.*, p. 202.

Femoral spine of gonopod present or absent. Tibial spine present. Tibial process long, slender, finely furrowed, simple, without lateral spines. A separate basal lobe to the tarsus generally not distinct; sometimes beset with fine spinules. The tarsus bearing a large papilla or rounded lobe with little spines and hairs.

Fringes of metasomite generally with simple points, sometimes subdivided. Prosomite with the usual concentric striations. Metasomite without peculiar sculpture. The upper longitudinal furrows distant from the pore. 6 (or 2+3) supralabral pits. Dorsal margin of anal segment angled, laterally compressed; the valves toothed on the dorsal end.

1. Subgen. CHALEPONCUS Att.

Tarsus of gonopod bears a projecting lappet with little spines or pins. Elements of fringes of metasomite simple, pointed. The marginal thickenings of the two anal valves immediately touching.

South Africa, several species (see below).

2. Subgen. *TRICHOCHALEPONCUS* nov.

Tarsus of gonopod beset with little hairs. Points of fringes of metasomite subdivided. Thickening of anal valves separated from the small marginal border by a furrow.

Congo.

One species, *C. fissicirratu*s Attems.

Synopsis of the Subgenus Chaleponcus.

- 1a. Colour black. The projection beset with little spines lies in the cavity of the tarsus of the gonopod *niger* Attems.
- 1b. Colour brown or black, with a median yellow stripe. The projection beset with spines runs to the tip of the tarsus or passes to the outer side 2.
- 2a. Femoral spine of gonopod present. A separate basal lobe of the tarsus of the gonopod visible, beset with little spines. Terminal lobe of tarsus very narrow, beset with numerous blunt pins and spines in the hollowed cavity and on the external surface. Dorsum with yellow median band 3.
- 3a. Coxite of gonopod slender, ending in a pointed cone, no tooth on the lateral side : on tarsus of gonopod a recurved plate. 57-58 segments
solitarius n. sp.
- 3b. Coxite of gonopod broad ; on the lateral side near the tip a tooth. Tarsus of gonopod without the recurved plate. 62-65 segments *masienensis* n. sp.
- 2b. No femoral spine. Spined lobe of tarsus not distinctly separated. Terminal lobe of tarsus not very narrow, rather broad. No yellow band on the dorsum. 61-62 segments. Width 4 mm. or more 4.
- 4a. Terminal lobe of tarsus of gonopod with a projection of spines, some of them divided into several points, running to the tip of the lobe. Metasomites with scattered pits, otherwise smooth *limbatus* Attems.
- 4b. Terminal lobe of the tarsus spined on the curved external side. Metasomite with scattered punctures and dense wrinkles *acanthophorus* n. sp.

258. *Chaleponcus niger* Attems.

(Pl. XXII, fig. 527.)

1914. Attems, Afrikan. Spirostrept., p. 204.

S.W. Africa, Sandup, N.W. of Tsumeb (B. 5969).

259. *Chaleponcus solitarius* n. sp.

(Pl. XVI, figs. 400, 401 ; Pl. XVII, fig. 407.)

Colour blackish-brown ; in middle of dorsum a yellow longitudinal band, moderately broad, beginning on collum and running to tip of anal segment (on the posterior segments the yellow band gradually expands laterally). Basal half of antennae yellow, distal half brownish.

♂, 57-58 segments. Width 1.8 mm.

Clypeus very smooth and shining. Six supralabral pits. Labral sinus rounded; ocelli distinctly convex. Cheeks with a short, rounded lobe. Sides of collum symmetrically narrowed, broadly rounded at the anterior angle, the sides straight; side margin with a small border; one arched fold. Anterior half of prosomite with a few fine, regular, concentric striations. The upper complete longitudinal furrows on the metasomite distant from the pore; then short furrows to the pore; dorsally to the pore, little pits. On the suture, the somites smooth dorsally, with microscopical needle-like fissures. Pores at junction of anterior and middle thirds. Fringes composed of small simple teeth.

Sternites with fine reticulation. Angle of dorsal margin of anal segment pointed, laterally compressed, keeled, and wrinkled. Valves moderately raised, marginal thickening moderately high, not accompanied by a furrow on the outside, toothed at the dorsal end. Anal scale arched. Anterior and middle pairs of legs padded, the posterior legs not. The seventh somite of male not enlarged.

Tip of gonopod-coxite pointed and conical. The broad, rounded lobe directed basally; the end of the lateral leaf not projecting. No tooth on the external margin. Femoral spine of gonopod (figs. 400, 407) strong, twisted. One large tibial spine present. Tibial process with fine furrows. Basal lobe of tarsus beset with fine spines on the margin and connected with one broad lobe (*t*, fig. 407) bearing one recurved plate with a narrow handle-like process. Terminal lobe narrow and hollowed out, and beset on the margin with numerous blunt pins and lobules (fig. 401). The single specimen was caked with soil and dirt and I am not able to give an exact drawing of this organ. The specimen was also dry, so that the description must be verified by means of better material.

Kaapmuiden, E. Transvaal (4043).

260. *Chaleponcus masienensis* n. sp.

(Pl. XXV, figs. 549-550.)

Colour dark brown or black, posterior half of metasomite dark reddish-brown. In the middle of the dorsum a narrow yellow stripe, interrupted on each metasomite by the reddish posterior margin. The stripe begins on the collum and runs to the penultimate segment.

♂ width 2.7-3.4 mm. 62-65 segments.

Labral sinus moderately deep. Six supralabral pits. Head very smooth. Collum: anterior angle broadly rounded, not projecting,

two folds. The free part of the prosomite and the metasomite finely wrinkled by very short furrows. The transverse sulcus sharp. The pore nearer to the suture. The upper complete longitudinal striae far from the pore; abbreviated striae present above these. Inner margin of anal valves not distinctly thickened, bearing three bristles. Upper spine strong; no papilla below. The scale triangular. Sternites smooth. Tibia and postfemur padded to the last pairs of legs. Fringes on posterior border of metasomite made up of simple little points like a saw.

Gonopods (fig. 550): coxite broad, on the top of the lateral leaf a little tooth, separated by a sinus from the short prong, directed basally. On the lateral side near the top a short tooth directed basally. Basal spine of telopodite a spiral. Tibial process without lateral spine. Tibial spine long and straight. Basal lamella of tarsus partially covered with little points or spines; at the tip a rounded branch covered with fine points and blunt spines (fig. 549).

Masiene, Chai Chai, Portuguese E. Africa (6014).

261. *Chaleponcus limbatus* Attems.

1914. Attems, Afrikan. Spirostrept., p. 204.

(Pl. XVI, fig. 402; Pl. XVII, figs. 403-406; Pl. XXV, figs. 551, 552.)

Colour dark brown; first two-thirds of prosomite yellow, visible when the animal is extended, especially on the middle segments. Posterior border of metasomite reddish-brown. Antennae and legs yellowish.

♂, 61-64 segments. Width 4.4-5 mm.

Clypeus very smooth and shining. Six supralabral pits, the outer ones not laterally placed. Ocelli distinctly convex. Cheeks of ♂ with rounded lobe. Sides of collum rounded and bent a little forwards in the anterior corner, the side straight; margin indistinctly bordered. Two folds. The regular and relatively strong concentric striations of the prosomite occupying the first two-thirds. Free part of prosomite and the metasomite with fine scattered punctuations. Longitudinal furrows of metasomites regular, very fine; the upper ones far from the pore. Between the upper complete furrow and the pore short furrows on the suture. Transverse suture well developed, the somites not constricted at the suture, the suture not visibly bent forwards in front of the pore. Fringes of metasomites composed of simple-pointed teeth (fig. 403). Sternites smooth. Stigmata triangular, normal.

Whole anal segment densely punctate, dorsal angle bluntly keeled. Marginal thickening of valves small, toothed at the dorsal end. No papilla below. Anal scale arched. Fourth and fifth joints of all legs padded.

Gonopods : a large, rounded lobe is separated off on the lateral side of the gonopod-coxite (figs. 404, 551, 552). At the tip a long, strong hook (TZ) directed basally. The margins partly sinuate. The medial leaf bears several lobes. Gonopod-telopodite (fig. 406) : no femoral spine ; tibial spine short, pointed. Tibial process simple, curved, S-shaped. Tarsus consisting of two large hollowed-out lobes, one of them narrow, boat-shaped, bearing in its concavity a projection of simple- or multiple-pointed spines. These spines are especially numerous towards the tip of the lobe and here the many-pointed spines are in the majority. No spined basal lobe separated off.

S.W. Africa.—Windhoek (5253, 4493) ; Tsumeb (5249) ; Tijgerboomfontein (B. 4121) ; Oncka, Ovamboland (5752) ; Neudamm and Farm Paulinenhof, near Windhoek ; Farm Neitsas, Grootfontein Distr. (Michaelsen).

262. *Chaleponcus acanthophorus* n. sp.

(Pl. XVII, figs. 408–411.)

Colour blackish-brown ; dorsum of prosomite yellow, posterior border of metasomite a somewhat lighter reddish-brown. Antennae and legs yellow.

♂, 62 segments. Width 4 mm.

Clypeus smooth. Six supralabral pits. ♂ cheeks with rounded lobe. Sides of collum broadly rounded, not projecting forwards. Two folds. The usual concentric striations on anterior half of prosomite. Free part of prosomite and the metasomite with dense, weak wrinkles and fine punctuations. Longitudinal furrows on metasomite continued to the pore by abbreviated furrows. Transverse suture well developed, very slightly bent forwards before the pore ; somites not constricted at the suture. Pore between anterior and middle thirds. Fringes resembling those of *C. limbatus* ; the boundaries visible in the coalesced part of the border ; the free points relatively long, simple teeth (fig. 411). Dorsal angle of anal segment laterally compressed, bluntly keeled. Anal valves with thickened margin, bearing three bristles, a little papilla on the lower and a strong tooth on the upper end ; anal scale arched. Sternites with microscopical reticulation.

Gonopod-coxite much resembling that of *C. limbatus* and differing only in details of contour (fig. 410). Gonopod telopodite (figs. 408, 409, 410) distinctly different. No femoral spine. Next to the short, strong, tibial spine (*Td*) another similar tooth (*Td*, fig. 410). Tibial process simple, bent into several curves. Basal part of tarsus relatively narrow, not hairy or spined; terminal lobe divided into two lobes, one long and slender terminated by a spine-like lappet, and one curved and rounded branch bearing numerous simple or forked spines on the outer side. Besides these two lobes several small lobes on the margin (figs. 408, 409).

Messina, N. Transvaal (B. 3934).

Gen. *HELICOCHEtus* Attems.

1909. Attems, Zool. Anz., xxxiv, p. 158.

1909. Attems, Sjöstedt's Kilimandjaro-Meru Exp., p. 55.

1914. Attems, Afrikan. Spirostrept., p. 205.

263. *Helicochetus dimidiatus* (Pet.).

1855. *Spirostreptus* (*Odontopyge*) *dimidiatus* (Pet.), Mon. Ber. Ak. Berlin, p. 79.

1862. *Spirostreptus* (*Odontopyge*) *dimidiatus* Pet., Nat. Reise Mossamb., p. 546.

1872. *Spirostreptus* (*Odontopyge*) *dimidiatus* Porat, Öfvers. Vet. Ak. Förh., p. 42.

1901. *Odontopyge attemsi* Verhoeff, Zool. Anz., xxiv, p. 656.

1914. *Helicochetus dimidiatus* Attems, Afrikan. Spirostrept., p. 207. Mozambique, Inhambane (Pet.), Caffraria (Porat), East Africa.

The locality Caffraria needs confirmation by a modern determination. All the species of *Spirostreptoidea* were very loosely defined when Porat wrote his paper.

Gen. *SOLENOZOPHYLLUM* Attems.

1914. Attems, Afrikan. Spirostrept., p. 210.

264. *Solenozophyllum anoncopygum* Attems.

1914. Attems, Afrikan. Spirostrept., p. 211.

The label bears the name "South Africa" without precise locality.

The literature contains a number of "Odontopyge," the descriptions of which are useless in a modern sense and can be applied to nearly all the species of *Odontopygidea*. I mention them for the sake of completeness :

Porat, Myr. Afric. Austral., 1872, Öfvers. Vet. Ak. Förh., v.

Odontopyge aequalis, Caffraria.

Odontopyge foveolata, Caffraria.

Odontopyge praetexta, Caffraria.

Odontopyge puncticauda, Caffraria.

Brandt, Rec. de Mem. Vel. a l'ordre d. Myr., 1841.

Odontopyge bicuspidata, Cape Province.

Odontopyge flavotaeniata, Cape Province.

Odontopyge gracilicornis, Cape Province.

Silvestri, Nuovi Diplop. racc. a Kazungula, 1896, Boll. Mus.

Torino, xi, No. 257.

Odontopyge exquisita, Kazungula.

Odontopyge jallae, Kazungula.

Silvestri, Descr. esp. nouv. Mus. Bruxelles, 1897, Ann. Soc. Ent.

Belge, xlii.

Odontopyge leptoproctus, Transvaal.

Voges, Beitr. z. K. Jul., 1878, Zeitschr. Wiss. Zool., xxxi.

Odontopyge binodifer, Port Natal.

Daday, Myr. extr. Mus. Nat. Hung., 1889, Term. Füzetek., xii.

Odontopyge pusilla, Transvaal.

2. SUPERORDER COLOBOGNATHA.

First pair of legs of seventh somite normal, not modified. Second pair of seventh and first pair of eighth somite modified to form gonopods. Papal lobes of gnathochilarium absent. Pleurites of head (the cheeks) small; more or less sunken and not visible. Pars lamelligera of the mandible atrophied.

The *Colobognatha* more than any other group of Diplopoda need accurate and comparative study, because we are badly informed about so many genera that the arrangement of the families can only be provisional. So far as I know, Silvestri alone has published a synopsis of the families in his "I Diplopodi." He used only the coalescence of pleurites, tergites, and sternites to define the families, and this exclusive use of one single character cannot give a result which corresponds with the natural affinities of the families. As I have no representatives of most of the families at my disposal I cannot

give a satisfactory synopsis, and must confine myself to the following key, which I have made up as well as I could from the literature.

Key to the Families of Colobognatha.

- 1a. Tergites, pleurites, and sternites completely coalesced. Body cylindrical
Siphoniulidae (one genus: *Siphoniulus*, India).
- 1b. Sternites always (pleurites often) free, *i.e.* connected by membranes with
neighbouring parts 2.
- 2a. Gnathochilarium possessing most of the parts typical of the Diplopoda
Platydesmidae (genera: *Platydesmus*, *Brachycybe*, *Fioria*, *Pseudodesmus*,
Dolistenus).
- 2b. Gnathochilarium consisting of a single plate or of several indistinctly defined
pieces 3.
- 3a. No eyes. The pores situated on keels or tubercles. Diameter of prosomites
distinctly less than that of the metasomites, so that the prosomites are like
constrictions between the metasomites. Sensitive rods on fifth and sixth
joints of antennae densely crowded together and the whole sunk in a round
groove (? in *Siphonorhinus*). Pleurites not coalesced with tergites
Siphonophoridae (genera: *Siphonophora*, *Siphonorhinus*).
- 3b. One or several ocelli present on each side. The prosomites not forming con-
strictions between the metasomites, their diameter not being appreciably
less than that of the metasomites 4.
- 4a. Pores situated on lateral lobes of the tergite. Tergites with distinct median
suture. Head completely concealed by the collum
Siphonocryptidae (genus: *Siphonocryptus*, India).
- 4b. Pores situated on the body of the tergite, far from the lateral margin. No
median suture. Head partly free and visible *Polyzonidae*.

Fam. POLYZONIDAE.

1894. Pocock, Max Weber's Reise, p. 337.

1896. Silvestri, I Diplop., p. 37.

This family has been divided into two subfamilies:

1. Subfam. POLYZONINAE Verhoeff.

1901. Subfam. *Polyzoniini* Verhoeff, Arch. Naturg., p. 253.

1908. Tribe *Polyzoniini* Ribaut, Nat. Myr., iv, Bull. Toulouse, xli,
p. 105.

Ventral ends of anal tergite overlying one another like the lappets of a coat; anal valves in the opening surrounded by these lobes. Vasa deferentia, with penis, opening behind second pair of legs and separated from them. Pores close to the transverse suture.

Genera: *Polyzonium* Brandt, *Orsiboe* Attems.

2. Subfam. HIRUDISOMINAE Silv.

1901. Subfam. *Heterozoniini* Verhoeff, Beitr. z. K. Pal. Myr., xx, Arch. Naturg., p. 253.

1908. Tribe *Heterozoniini* Ribaut, Bull. Toulouse, xli, p. 106.

Anal segment consisting of one ventral closed annular part and the valves. Vasa deferentia opening in coxae of second pair of legs. Pores remote from transverse suture.

Synopsis of the Genera of Hirudisominae.

1a. Two or three ocelli on each side; anal segment completely concealed by prae-anal segment and not visible from above

Hirudisoma Cav. (Syn. *Heterozonium* Verhoeff, Ribaut).

1b. One ocellus on each side. Anal segment partly visible from above . . . 2.

2a. Anterior gonopod 6-jointed, posterior gonopod 7-jointed. Pleurites nearly coalescent with tergites *Burenia* nov. gen.

2b. Anterior gonopod 4-jointed, posterior gonopod 3- to 5-jointed; pleurites connected with tergites by membranes

Rhinotus Cook (Syn. *Orsillochus* Attems).

Gen. BURENIA nov.

Head conical, moderately slender, no break before the eyes. One ocellus on each side surrounded by a spot of black pigment. Sixth joint of antennae the largest; fifth, sixth, and seventh joints with one row of sensitive rods projecting freely on the distal margin. Eighth joint with four sense cones. Gnathochilarium a united plate. Hypostoma as in allied forms.

Second pairs of legs of ♂ 6-jointed; vasa deferentia opening in the coxae with a penis connected to the coxae by articulation. Terminal claw surrounded by several long bristles. Transverse border of somites semicircular. Tergites with transverse suture, on the anterior segments finely pubescent. Pores from fifth to prae-anal segment half-way between suture and posterior margin, remote from lateral margin. Pleurites and tergites solidly connected, the two sternites and the pleurites connected by membrane. Prae-anal segment with two pairs of legs and two pores. Anal segment consisting of one united, dorso-ventrally compressed ring without suture and the two valves; partly visible from above. Coxae, except some of the last pairs, with pouches.

Anterior gonopods 6-jointed, the coxae inserted fairly far. Terminal joint with bristles and one large claw (one tarsal joint and

praetarsus coalesced ?), hollowed out on the aboral side with a little conduit-lobe for the posterior gonopod. Posterior gonopod 7-jointed ; terminal joint very long and thin.

265. *Burenia nasuta* n. sp.

(Pl. XVII, figs. 412-424.)

Colour reddish-brown with fine, dark marbling. Antennae blackish. Pigment of eyes black. Legs pale yellow.

♂, 64-88 segments. Width 0.9 mm. Length of one somite 0.26 mm.

Head (fig. 412) conical, sparsely pubescent, the hairs small. One very long bristle on the inner side of each eye. Each eye with one large ocellus lying in a large black pigment-spot. Head covered as far as the posterior margin of the eyes by the collum. No break like steps of a stair before the eyes. Antennae very thick, 8-jointed ; sixth joint the largest, seventh joint small, eighth very small. First, second, and seventh joints with one whorl of hairs, third and fourth joints with two whorls ; fifth and sixth joints with scattered hairs arranged irregularly. Eighth joint hairless. On distal margin of fifth and sixth joints several short, thick, sensitive rods ; on the seventh joint the rods are more slender. These rods are situated in the open, not in a pouch as in *Siphonophora*. Eighth joint with four slender sense cones (fig. 413). Collum with six transverse rows of hairs. First segment apodous. The hypostome is a small transverse plate connecting the ends of the collum.

Anterior tergites with two rows of hairs, diminishing progressively in size and number. Tergites smooth ; the pores in an uninterrupted row (fig. 421) from the fifth segment to the prae-anal segment, midway between the suture and the posterior margin ; the first pore visibly lower than the following ones. In cross section the somites are semi-circular ; no lateral keels or lobes. Lateral margin of body straight ; the anterior and posterior angles at the sides of the tergites are 90°. No median suture in the tergites ; transverse suture very fine. The pleurites are nearly immovably connected with the tergites by a suture, but the two can be separated by teasing them out with the needle. The differentiation "pleurites coalesced with the tergites" and "pleurites free," as used by Silvestri, is not a good character and should not be used in tabular keys, because it is usually difficult to decide which of these cases is being dealt with.

Anal segment visible from above as a low triangle. It consists of a ring compressed in a dorso-ventral direction, without suture, but

with one longitudinal oval opening on the ventral surface (fig. 424), and in this opening the anal valves (*av*) are inserted. The margin of the opening bears some bristles. Pleurites or an anal scale cannot be distinguished; the whole ring (*R*) is a single piece. The preceding segment, the prae-anal (*Pra*), has the same pleurites as all the other body segments, two pores and two pairs of legs. There is thus no apodous segment before the anal segment.

Second pair of legs of ♂ (fig. 416) 6-jointed, sparsely pubescent. The penis (*P*) is inserted by means of an articulation on the coxae, and is a slender pin-like structure. The terminal claw is surrounded and surpassed by dense groups of long bristles (fig. 419); on the third leg under the claw are several bristles closely pressed together, resembling a single striated bristle. The legs behind the gonopods have only one strong bristle beneath the claw (fig. 420).

The anterior gonopods (fig. 423) are inserted for some distance on the well-developed sternite (*v*) and separated by the broad sinuate border of the sternite. Each gonopod 6-jointed. The last joint seems to be derived from the coalescence of one tarsal (*ta*) and one praetarsal (*prt*, figs. 414, 415) joint in the sense of Myere. The basal part of this product, the tarsus, bears on the oral side several bristles; on the aboral side it is hollowed out and the margin bears a little rounded lobe (*lo*, fig. 414), a conduit-lobe for the posterior gonopod. The distal part of the double joint, the praetarsus, is not separated from the tarsal portion by any suture, and consists of one broad lamelliform claw (*cl*) and a secondary claw (*clt*) also lamelliform. The gonopod with scattered hairs. The posterior gonopods (fig. 422) are inserted far apart. The second joint is a short disc. The third to the sixth joints diminish gradually; the base of the terminal joint is knob-like, the remainder long, thin, and whip-like (fig. 417), the tip hollowed out like a funnel (fig. 418) as in *Orsiboe*. One long bristle on the third joint, the rest of the gonopod hairless.

Knysna (B. 5257).

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PLATE I.

Schindalmonotus hystrix Att.

1. General dorsal view.
2. Labrum.
3. One dorso-lateral and one pleural cushion with bristles.
4. A part of one pleural cushion.
5. Two lateral bristles.
6. Dorsal scale.
7. Second leg and penis.

Sphaerotherium spinatum.

8. Marginal bristles.
9. Anterior gonopods.
10. Posterior gonopod.

Sphaerotherium rotundatum Brandt.

11. Posterior gonopod.
12. Anterior gonopod.
13. Coxae and vulva, ♀.
14. Marginal bristles.

Sphaerotherium tenuitarse Silv.

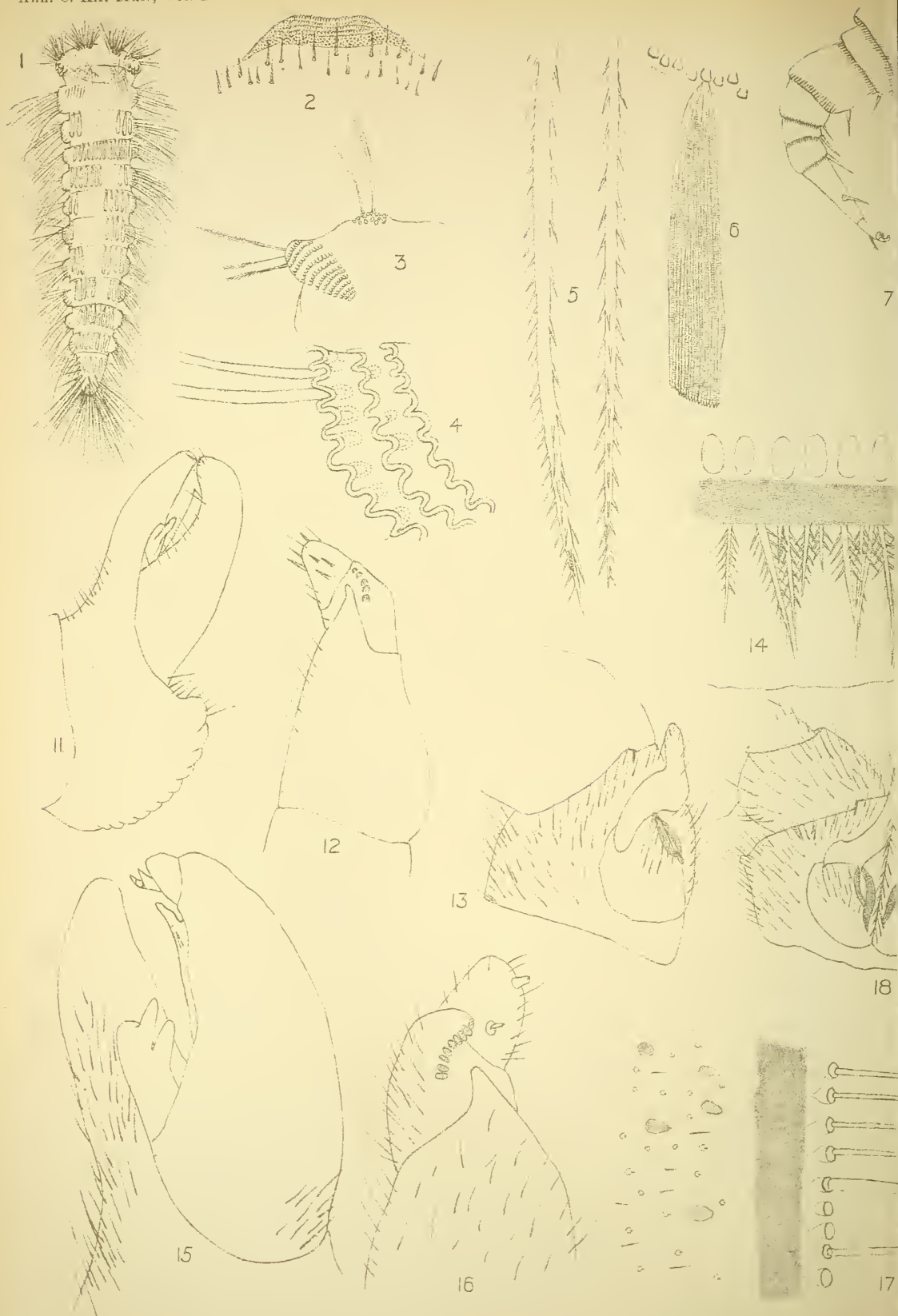
15. Posterior gonopod.
16. Anterior gonopod.
17. Marginal bristles.
18. Coxae of second leg of ♀.

Sphaerotherium kitharistes Att.

19. One of the last legs of the ♂.
20. Posterior gonopod.
21. Marginal bristles.
22. Second leg of ♀; coxae and vulva.

Sphaerotherium commune Att.

23. Coxae of the tenth leg.
24. Anterior gonopod.
25. Posterior gonopod.
26. Second leg of the ♀.



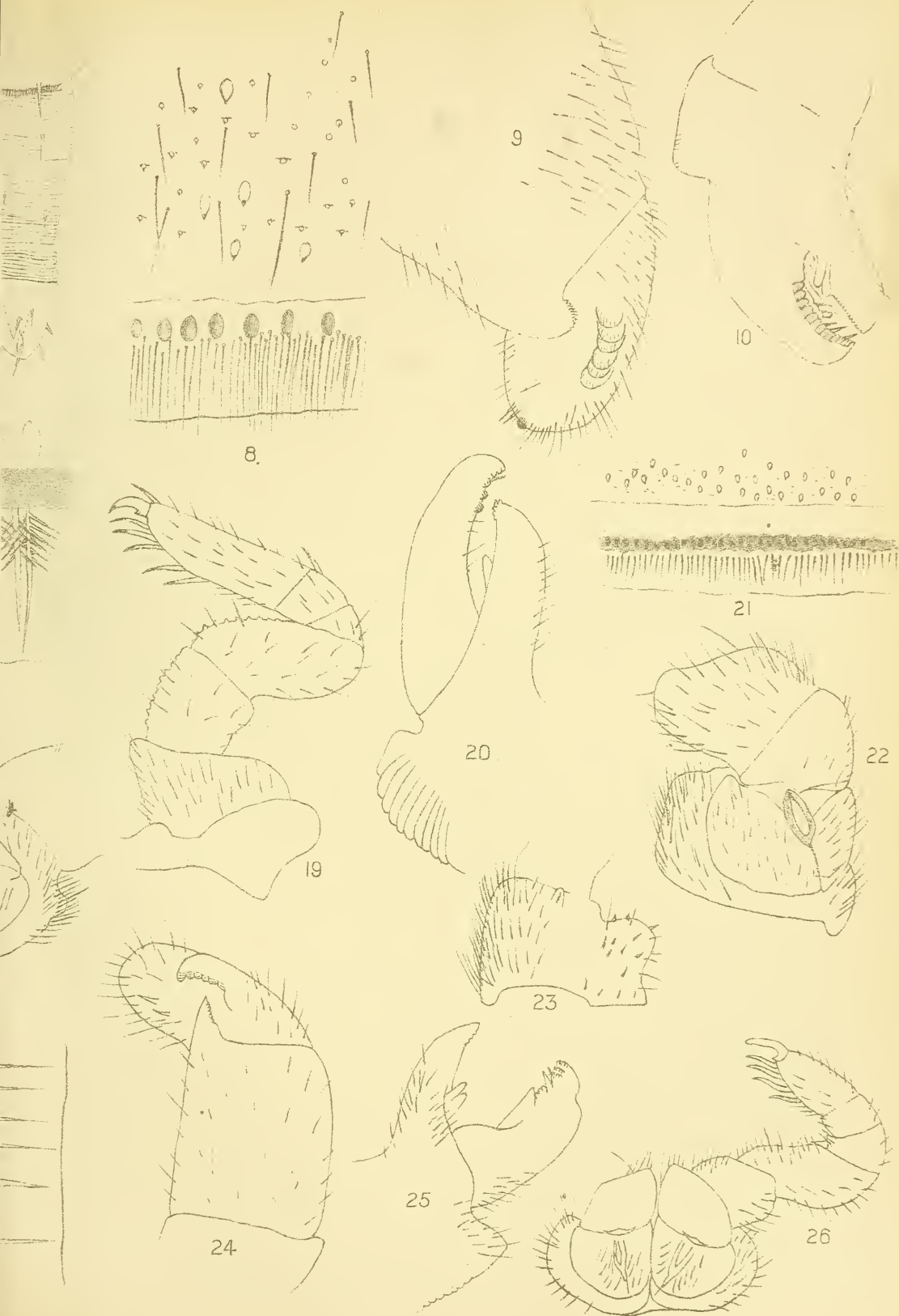


PLATE II.

Sphaerotherium commune Att.

27. Tarsus of posterior gonopod.

Sphaerotherium tuberosum Att.

28. Posterior gonopod.
29. Vulva of ♀.

Sphaerotherium trichopygum Att.

30. Marginal bristles.
31. Posterior gonopod.

Sphaerotherium cinctellum Silv.

32. Posterior gonopod.
33. Marginal bristles.
34. Anterior gonopod.
35. Coxae of tenth leg.
36. Vulva.
37. Last joint of leg.

Sphaerotherium plagiarium Silv.

38. Beads on the anterior margin of the metasomite.
39. Marginal bristles.
40. Last joint of a leg.
41. Coxae of tenth leg.
42. Anterior gonopod.
43. Posterior gonopod.

Sphaerotherium ancillare Attems.

44. Coxae of tenth leg.
45. Vulva.

Sphaerotherium dorsaloide Silv.

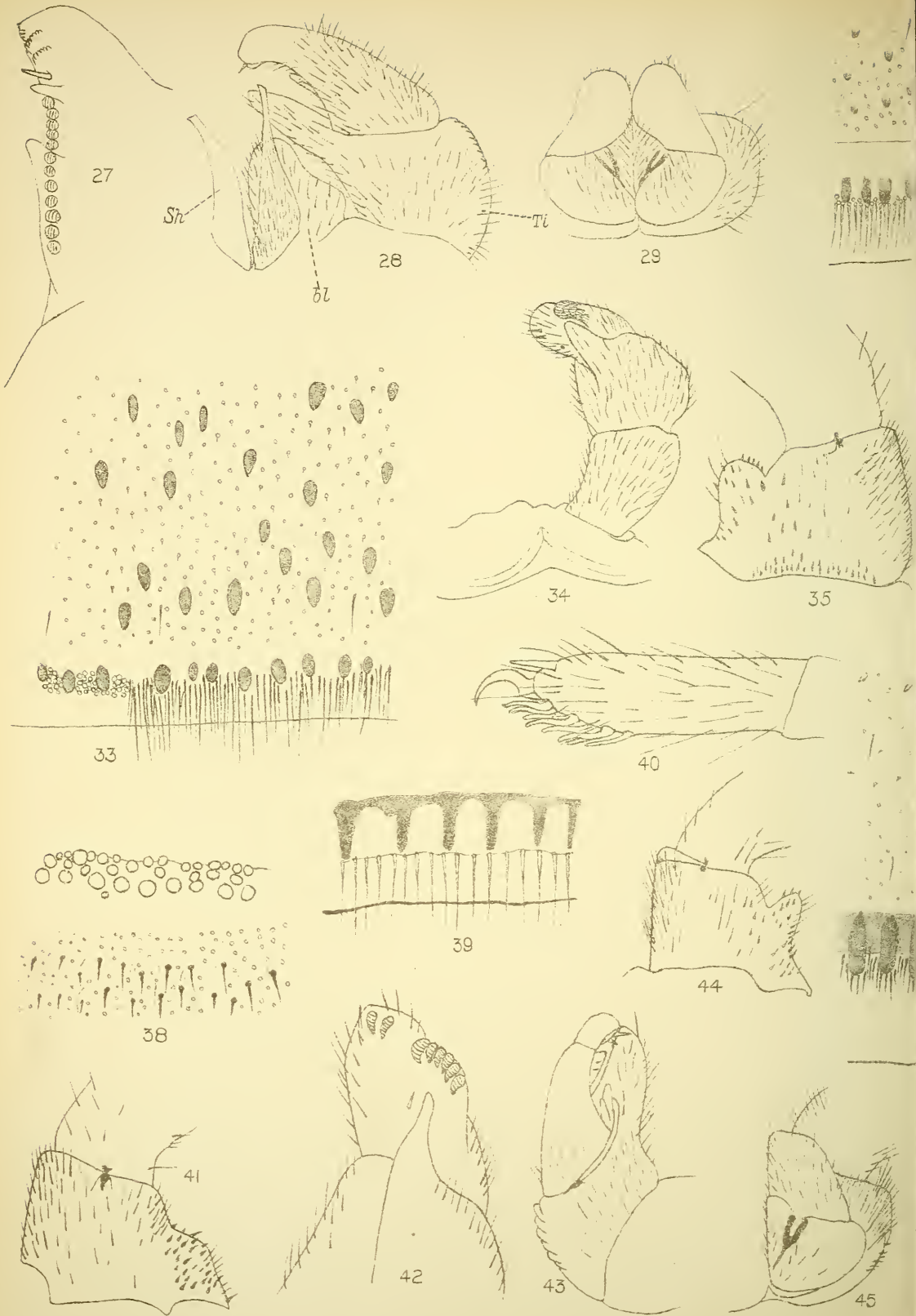
46. Marginal bristles.
47. Coxae of tenth leg.

Sphaerotherium dorsale Gerv.

48. Posterior gonopod.
49. Third joint of a leg.
50. Anterior gonopod.
51. Longitudinal section through a tergite.
52. Marginal bristles.

Sphaerotherium subdorsale Silv.

53. Anterior gonopod.



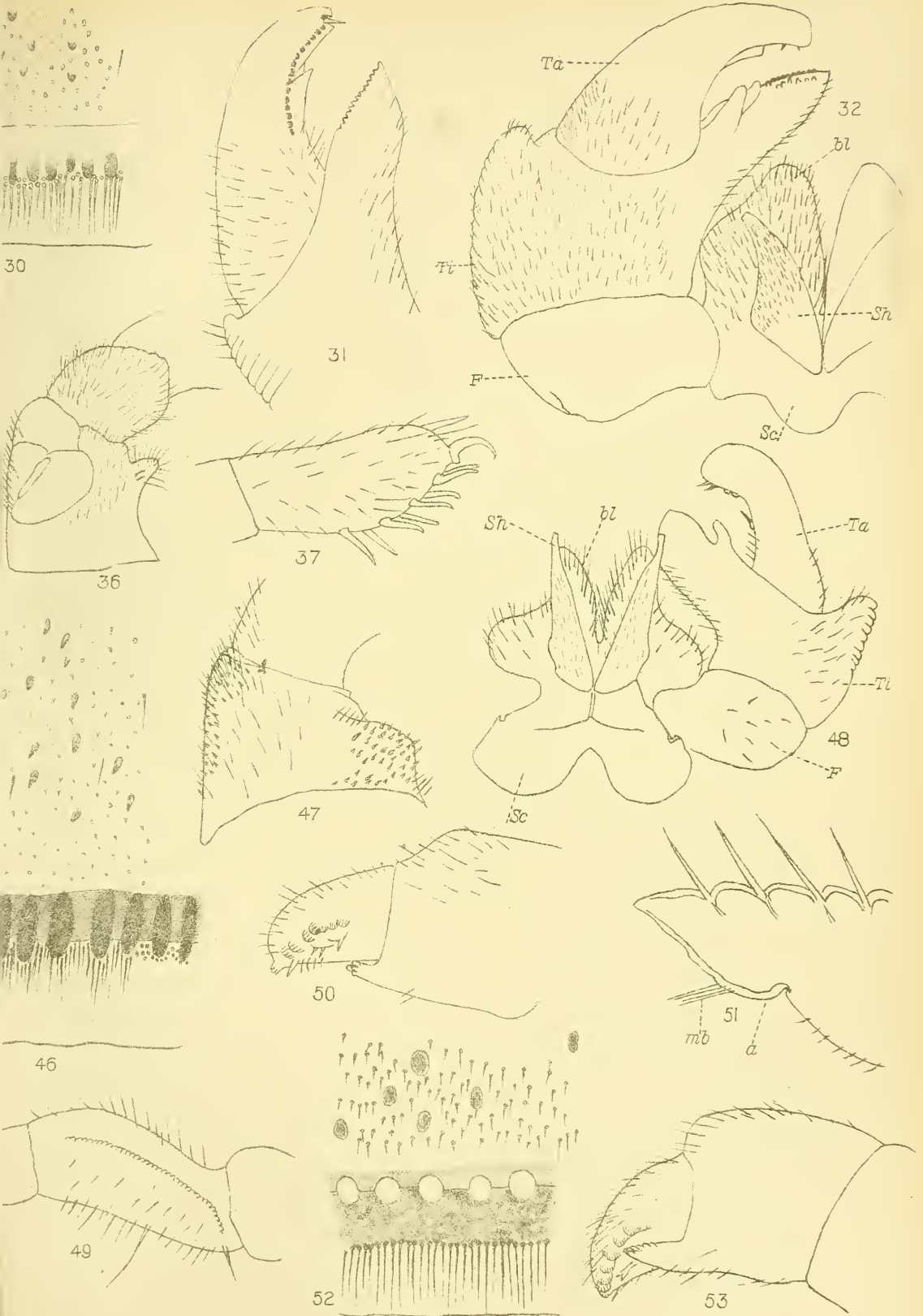


PLATE III.

Sphaerotherium subdorsale Silv.

- 54. Posterior gonopod.
- 55. Marginal bristles.

Sphaerotherium eremita Attems.

- 56. Coxae of tenth leg.
- 57. Marginal bristles.
- 58. Vulva.

Sphaerotherium civicum Att.

- 59. Coxal horns of posterior gonopods.
- 60. Tarsus of posterior gonopod.
- 61. Three marginal bristles, more highly magnified.
- 62. Marginal bristles.
- 63. Coxae of tenth leg.

Sphaerotherium dicrothrix Att.

- 64. Anterior gonopod.
- 65. ♂ coxae of tenth leg.
- 66. Tarsus of posterior gonopod.
- 67. Vulva.
- 68. Posterior gonopod.
- 69. Marginal bristles.

Sphaerotherium punctulatum Brandt.

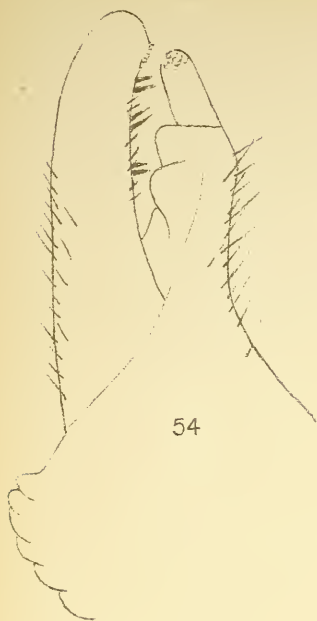
- 70. Marginal bristles.
- 71. Posterior gonopod.
- 72. Anterior gonopod.
- 73. Coxae of tenth leg.
- 74. Vulva.

Sphaerotherium modestum Att.

- 75. Vulva.
- 76. Coxae of tenth leg.
- 77. Marginal bristles.

Sphaerotherium solitarium Att.

- 78. Marginal bristles.
- 79. Coxae of tenth leg.
- 80. Vulva.



54



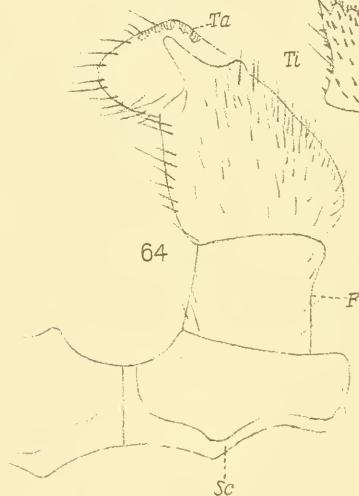
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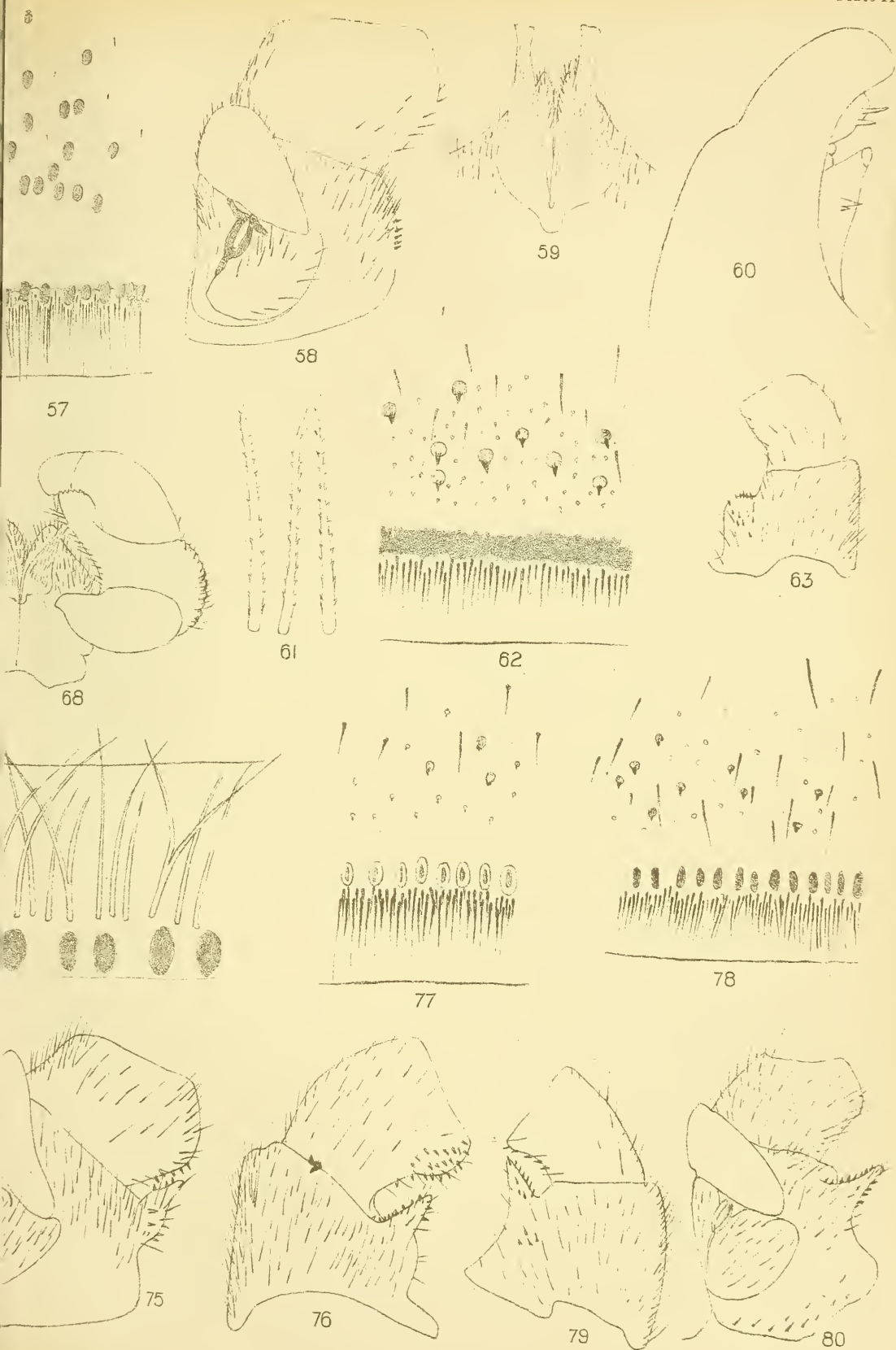


PLATE IV.

Sphaerotherium giganteum Por.

- 81. Intersegmental membrane.
- 82. Marginal bristles.
- 83. Posterior gonopod.
- 84. Anterior gonopod.

Podochresimus republicanus Att.

- 85. Fifth segment.
- 86. Gonopod, view of inner side.
- 87. Gonopod, tibial process and tarsus.
- 88. Fourth leg of ♂.
- 89. Second leg of ♂.

Podochresimus aculeatus Att.

- 90. Gonopod-tarsus, view of outer side.
- 91. Gonopod, view of inner side.
- 92. Sheath branch of gonopod-tarsus.
- 93. Fifth leg of ♂.

Podochresimus fonticinus Att.

- 94. Gonopod-tarsus.
- 95. Gonopod.
- 96. Fifth segment of ♂.
- 97. Second leg, ♂.
- 98. Fifth leg of ♂.

Habrodesmus rhodesianus Att.

- 99. Gonopod, view of inner side.
- 100. Gonopod, view of outer side.
- 101. Gonopod, tibiotarsus, inner side.

Platytarrus cryptodesmoides Att.

- 102. Marginal fringes of metasomite.



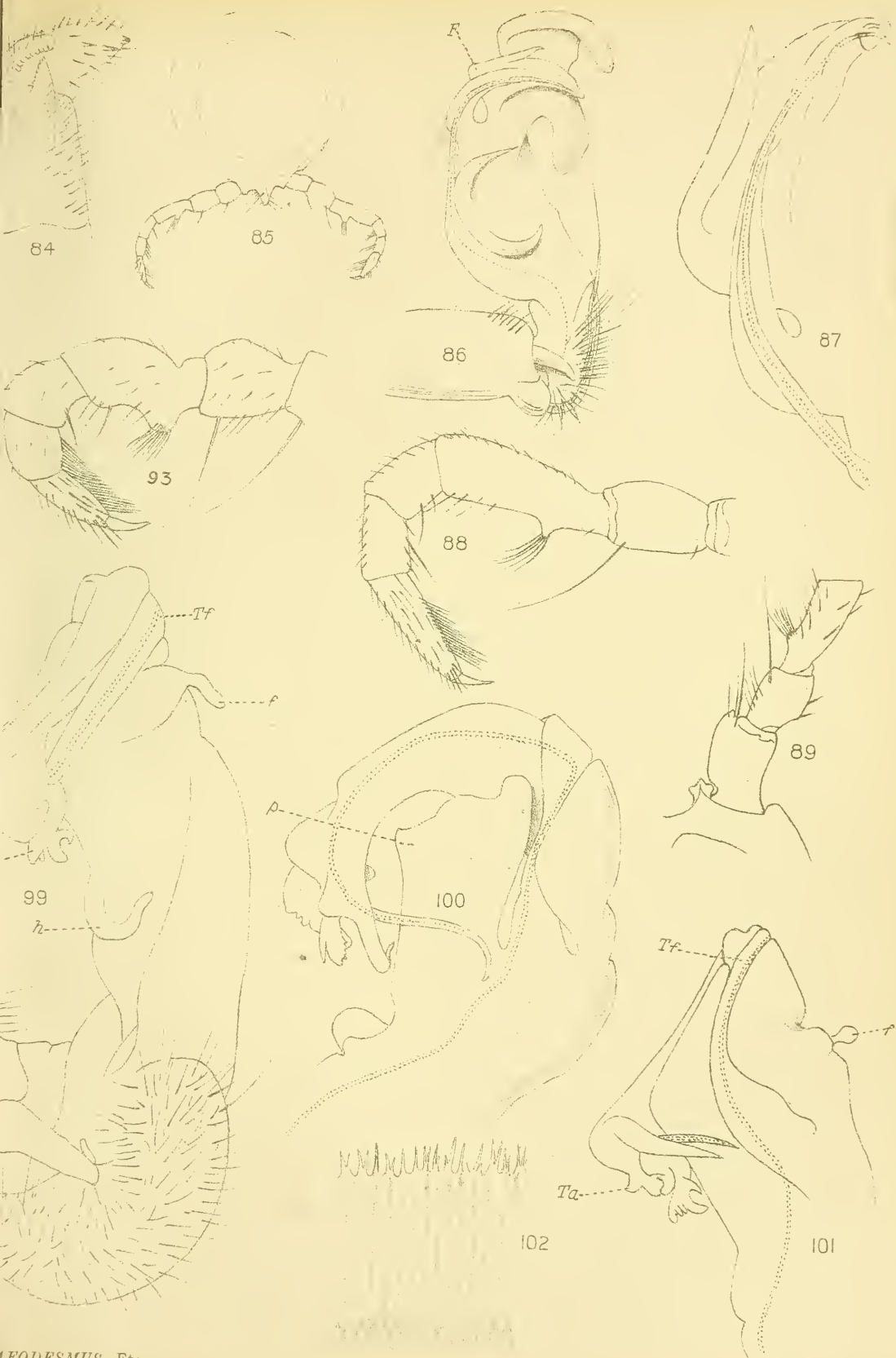


PLATE V.

Platytarrus cryptodesmoides Att.

- 103. Gonopods, oral view.
- 104. Gonopods, aboral view.
- 105. Gonopods, profile.
- 106. Twelfth segment.

Habrodesmus rhodesianus Att.

- 107. Sternite 5 and fourth leg of ♂.

Gonokollesis nanus Att.

- 108. Gonopods, aboral view.
- 109. Gonopods, oral view.
- 110. Antennae, the last joint.
- 111. Spines of the sixth joint of the antennae.
- 112. Antennae.
- 113. Fourth leg of the ♂.
- 114. Seventh segment of ♂ without gonopods, ventral view.

Gnomeskelus clavatus Att.

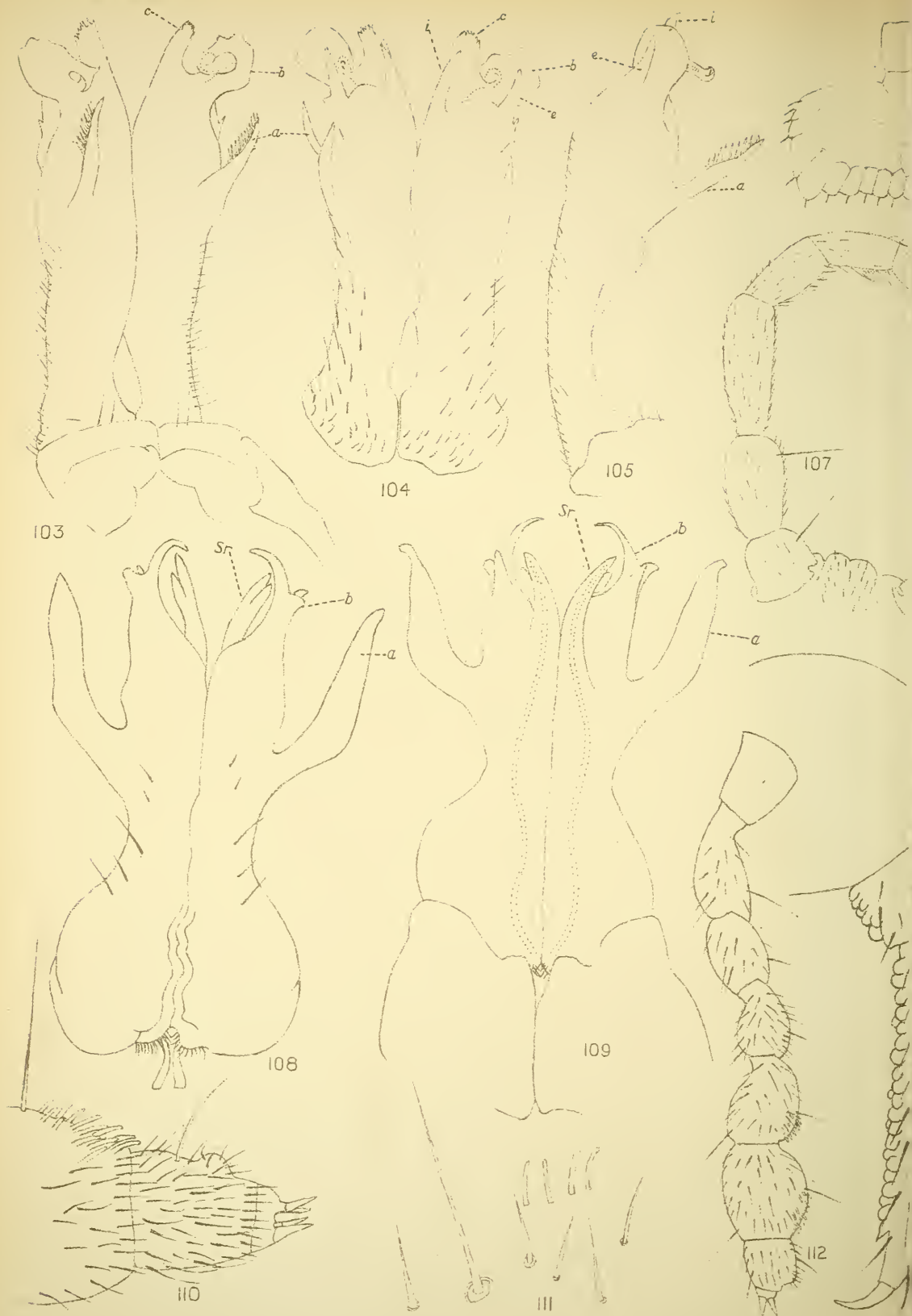
- 115. Bases of second pairs of legs of ♂.
- 116. Fifteenth leg of the ♂.
- 117. Last joint, more highly magnified.
- 118. Gonopod.

Gnomeskelus rhodobates Att.

- 119. Cones on the femur of the fifth leg of ♂.
- 120. Gonopod.
- 121. Spheres and bristles of the second tarsus. Fifth leg, ♂.

Gnomeskelus terreus Att.

- 122. Seventh segment.
- 123. Gonopod telopodite, aboral view.
- 124. Lateral view of same.



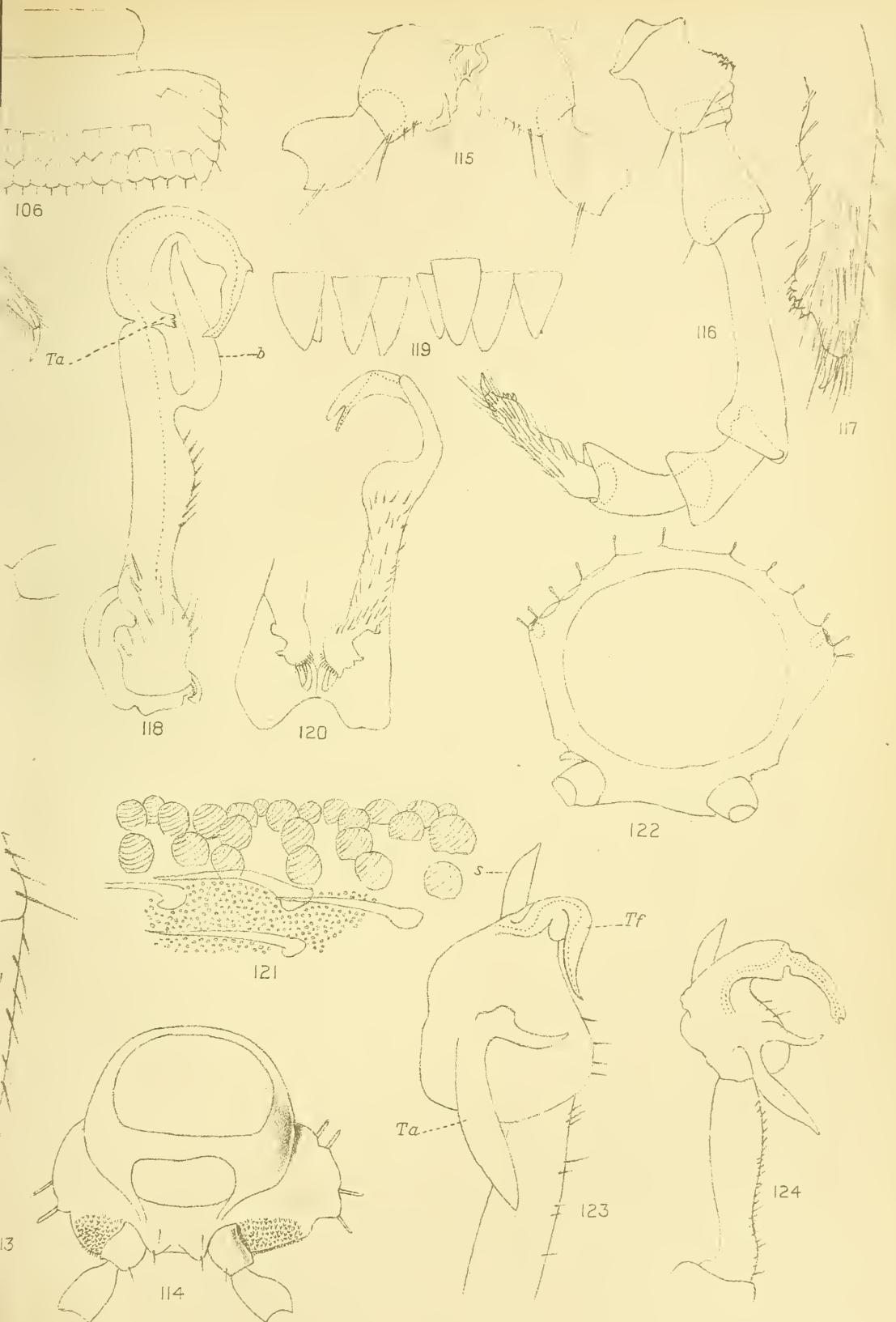


PLATE VI.

Gnomeskelus silvaticus Att.

- 125. Gonopod telopodite, inner side.
- 126. Cones of the third joint, fifth leg of ♂.
- 127. Gonopod telopodite, lateral view.
- 128. Twentieth leg of ♂.

Gnomeskelus natalicus Att.

- 129. Gonopods, aboral view.
- 130. Gonopods, oral view.
- 131. Fifth leg, ♂.
- 132. Tenth segment, ♂.

Gnomeskelus ceresinus Att.

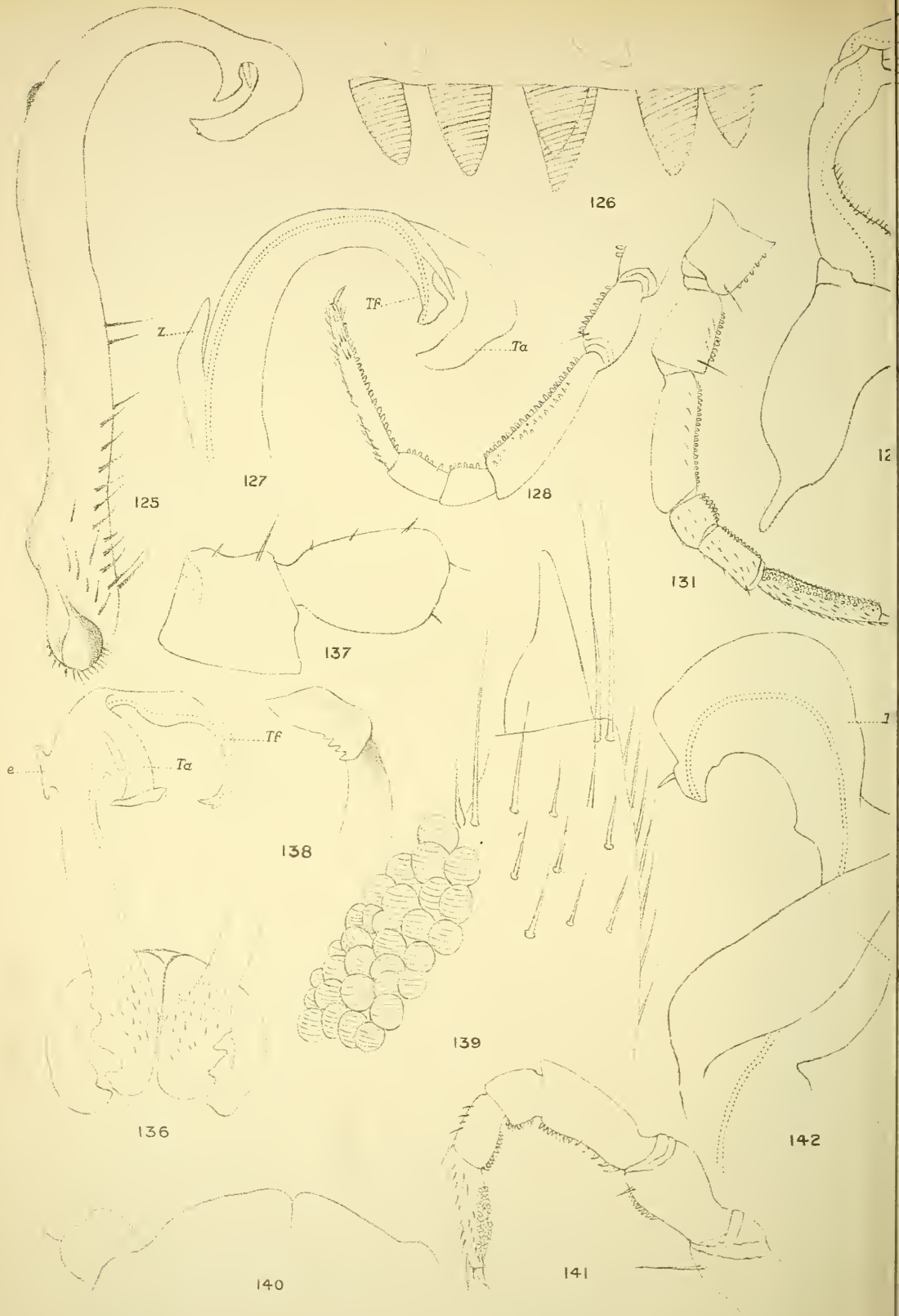
- 133. Gonopod, oral view.
- 134. Telopodite of the gonopod, aboral view.
- 135. Bases of second leg of ♂.

Gnomeskelus globifer Att.

- 136. Gonopod.
- 137. Coxae of second leg, ♂.
- 138. Tip of the gonopod-tarsus.
- 139. Last joint, fifth leg, ♂.
- 140. Lamellae surrounding the gonopodial opening, seventh segment.

Gnomeskelus repandus Att.

- 141. Fifth leg, ♂.
- 142. Gonopod-tarsus.
- 143. Gonopod, aboral view.
- 144. Gonopod, oral view.
- 145. Gonopod, inner side.
- 146. Coxae of second leg, ♂.



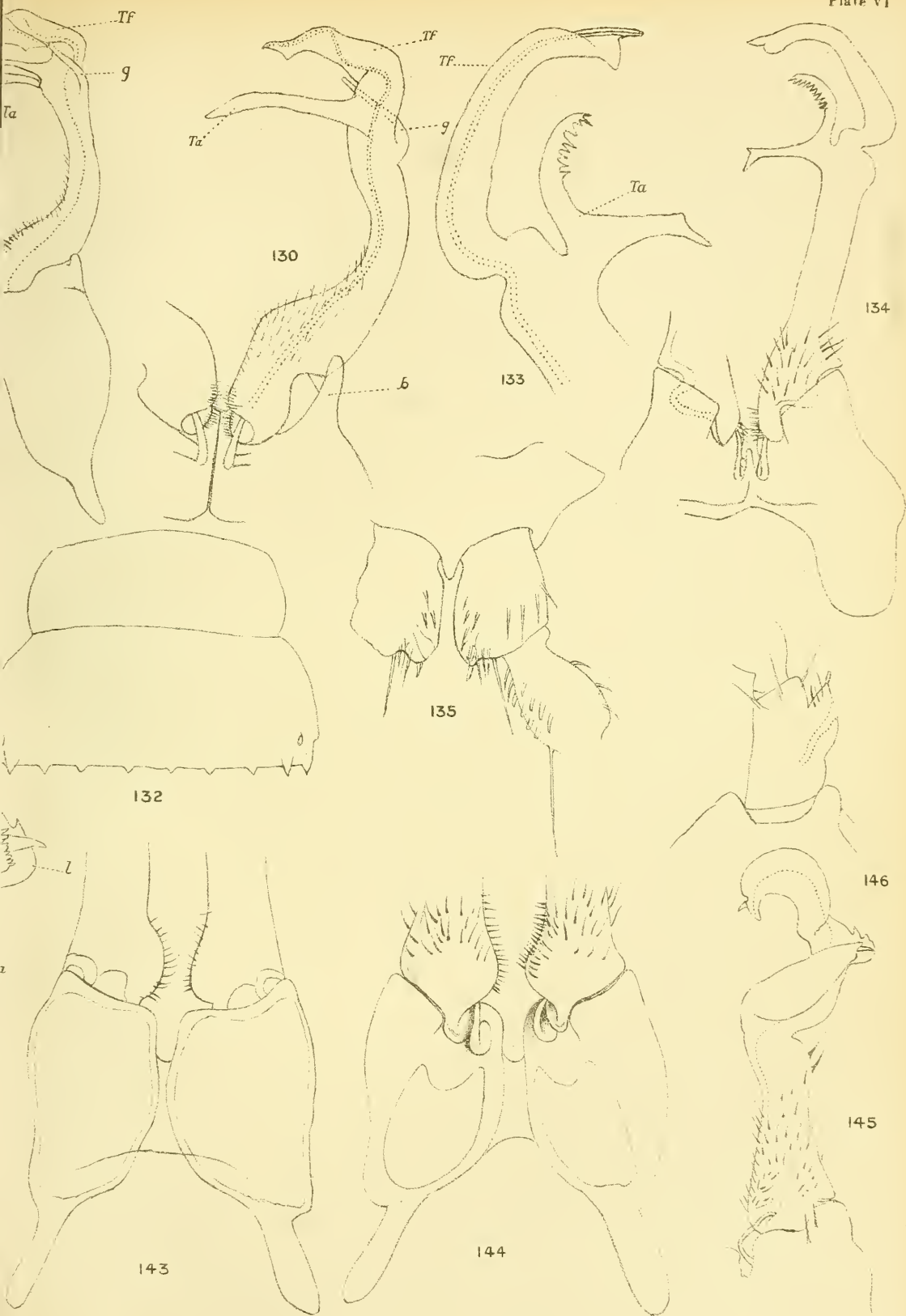


PLATE VII.

Gnomeskelus repandus Att.

147. Sternite, seventh segment, ♂.

Gnomeskelus puteinus Att.

- 148, 149. Gonopod.
150. Second leg, ♂.

Philocaffrus destitutus Att.

- 151, 152. Gonopod.
153. Marginal fringes, seventh segment, ♂.
154. Seventh segment, ♂.

Philocaffrus divisus Att.

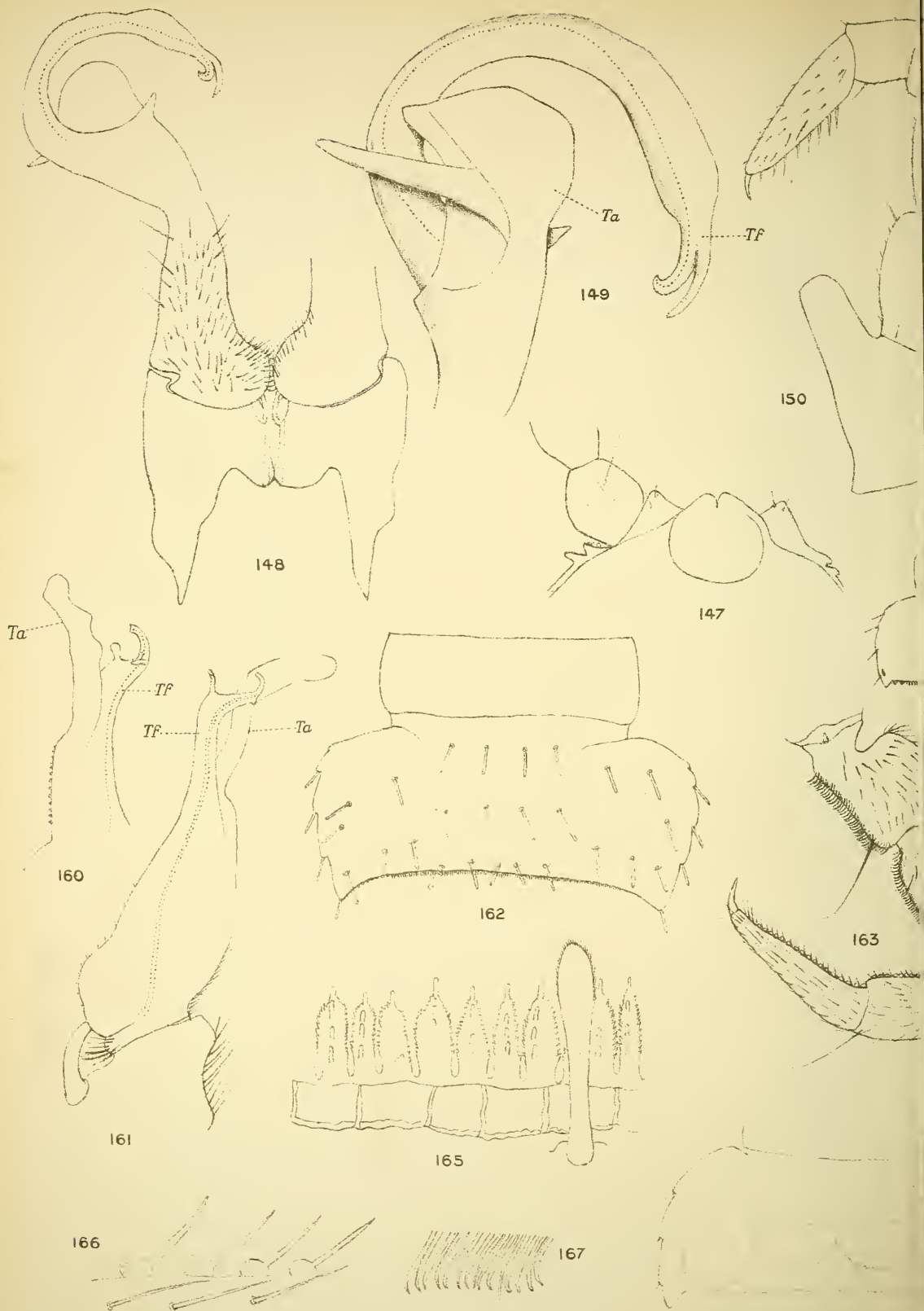
155. Right gonopod, inner profile.
156. Left gonopod, aboral view.
157. Gonopod-bases, aboral view.
158. Marginal fringes, seventh segment, ♂.
159. Ninth segment, ♂.

Philocaffrus polydesmoides Att.

- 160, 161. Gonopods.
162. Eighth segment, ♂.
163. Fourth leg, ♂.
164. Antennae.
165. Marginal fringes, eighth segment, ♂.
166. Spherical bristles of the second tarsus.
167. Sickie bristles of the ventral surface of the femur. Sixth leg.

Philocaffrus bifalcatus Att.

168. Ninth segment, ♂.
169. Ventral surface of the first tarsus, fifth leg, ♂.
170. Second tarsus, fifth leg, ♂.
171. Fourth leg, ♂.
172. Marginal fringes.



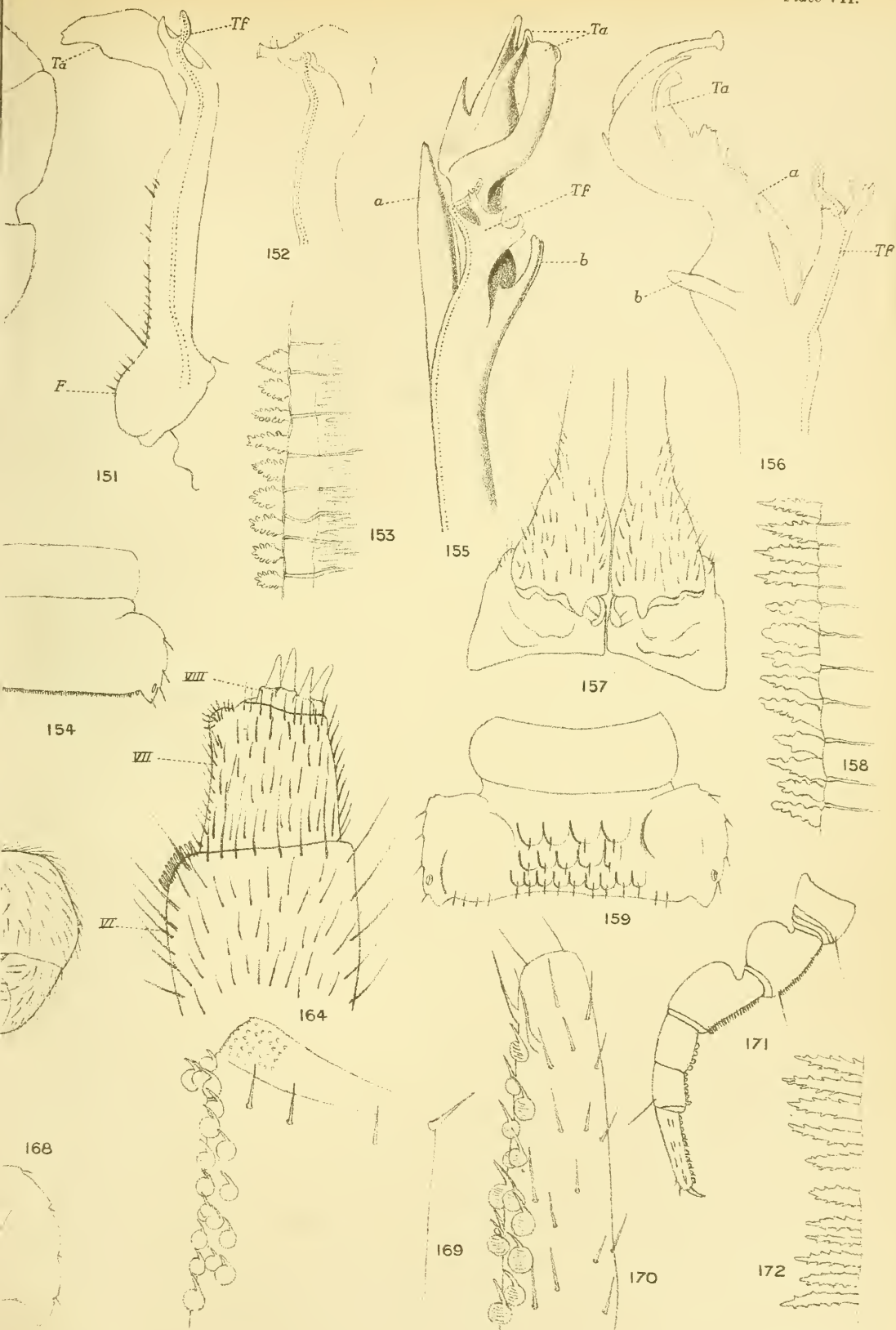


PLATE VIII.

Philocaffrus bifalcatus Att.

- 173. Gonopod.
- 174. Last joint of one of the posterior legs.

Antiphonus conatus Att.

- 175, 176. Gonopods.
- 177. Sixth segment, ♂.
- 178. Seventh segment without gonopods.
- 179. Eighth and ninth segments.

Antiphonus circulus Att.

- 180. Last joint, fourth leg, ♂.
- 181. Second leg, ♂.
- 182, 183. Gonopods.
- 184. Keels of tenth and eleventh segments.
- 185. Sixth segment, ♂.

Ulodesmus bispinosus Att.

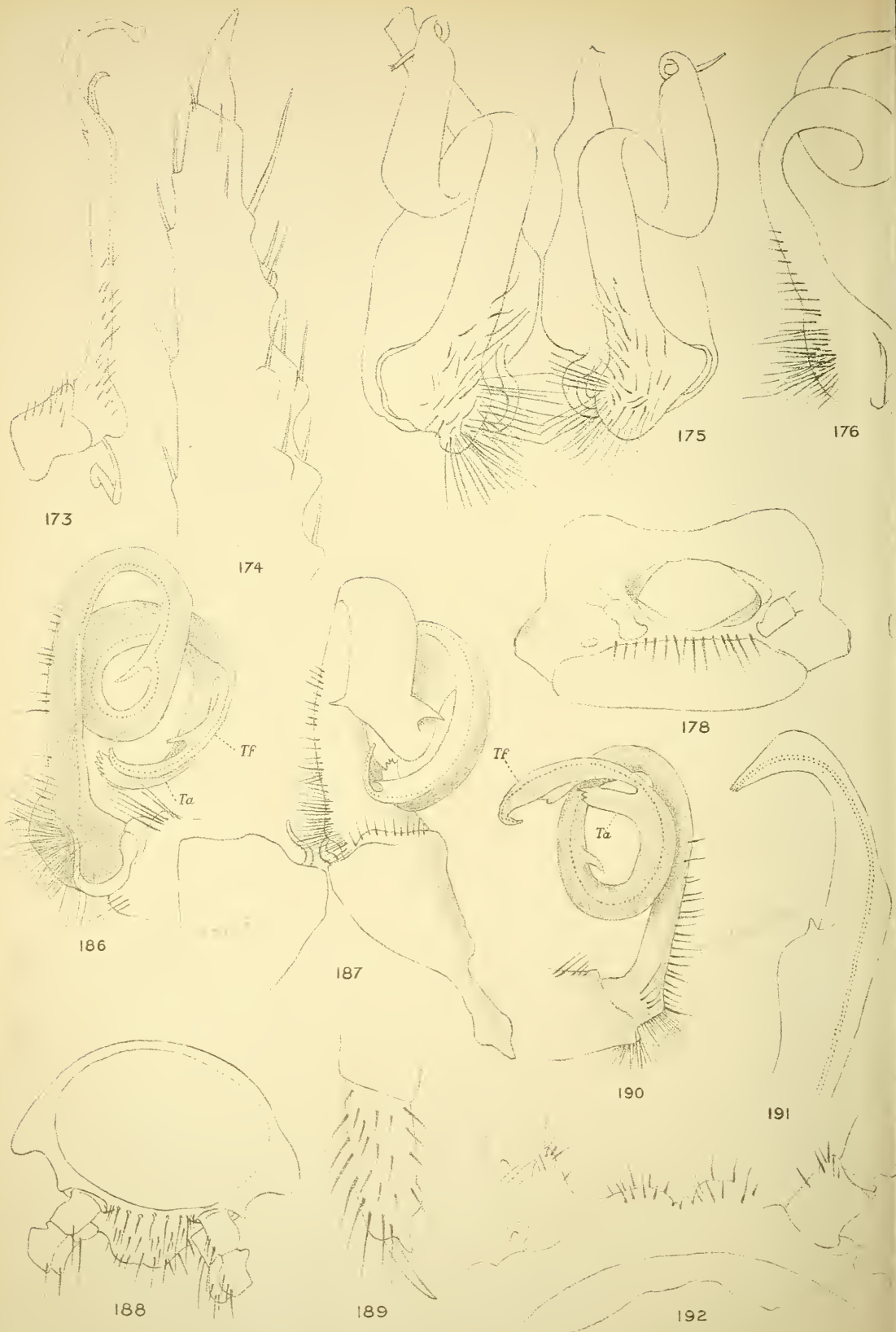
- 186, 187. Gonopods.
- 188. Sixth segment, ♂.
- 189. Last joint of one of anterior legs.

Ulodesmus micramma Cook.

- 190, 191. Gonopod.
- 192. Sixth segment, ♂.
- 193. Keels of eighth and ninth segments.
- 194. Fifth leg, last joint, ♂.

Ulodesmus securifer Att.

- 195. Sixth segment, oral view.
- 196, 197. Gonopods.



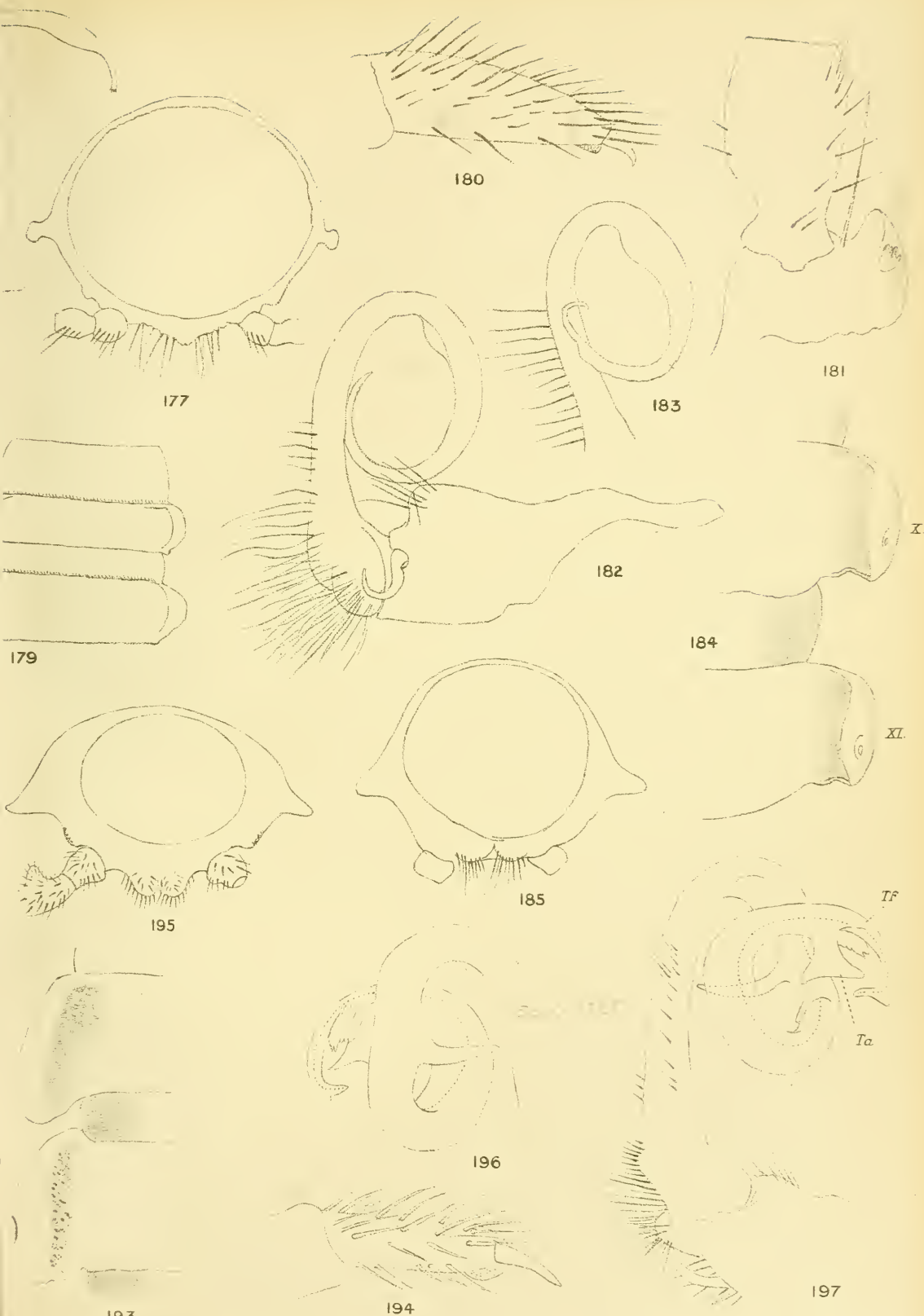


PLATE IX.

Ulodesmus biconus Att.

- 198. Gonopod.
- 199. Telopodite of the gonopod, profile.
- 200. Tip of the telopodite.
- 201. Last joint of fifth leg.
- 202, 203. Thirteenth segment.

Aulodesmus peringueyi Att.

- 204. Gonopod, view of inner side.
- 205. Posterior end of the body, dorsal view.
- 206. Part of the gonopodial telopodite, view of outer side.
- 207. Tip of the gonopod.
- 208. Sternal process of sixth segment.
- 209. Last joint of fifth leg.

Aulodesmus oxygonus Pet.

- 210. Part of gonopodial telopodite (the same part as fig. 206).

Aulodesmus laticollis Att.

- 211. Gonopod.
- 212. Gonopod, view of inner side.
- 213. Last joint of fifth leg.
- 214. Tip of the gonopod.
- 215. Fifth leg.

Chersastus fasciatus Att.

- 216, 217. Anterior gonopods.
- 218, 219. Posterior gonopods.
- 220. Fifth leg of ♂.

Chersastus ruber Att.

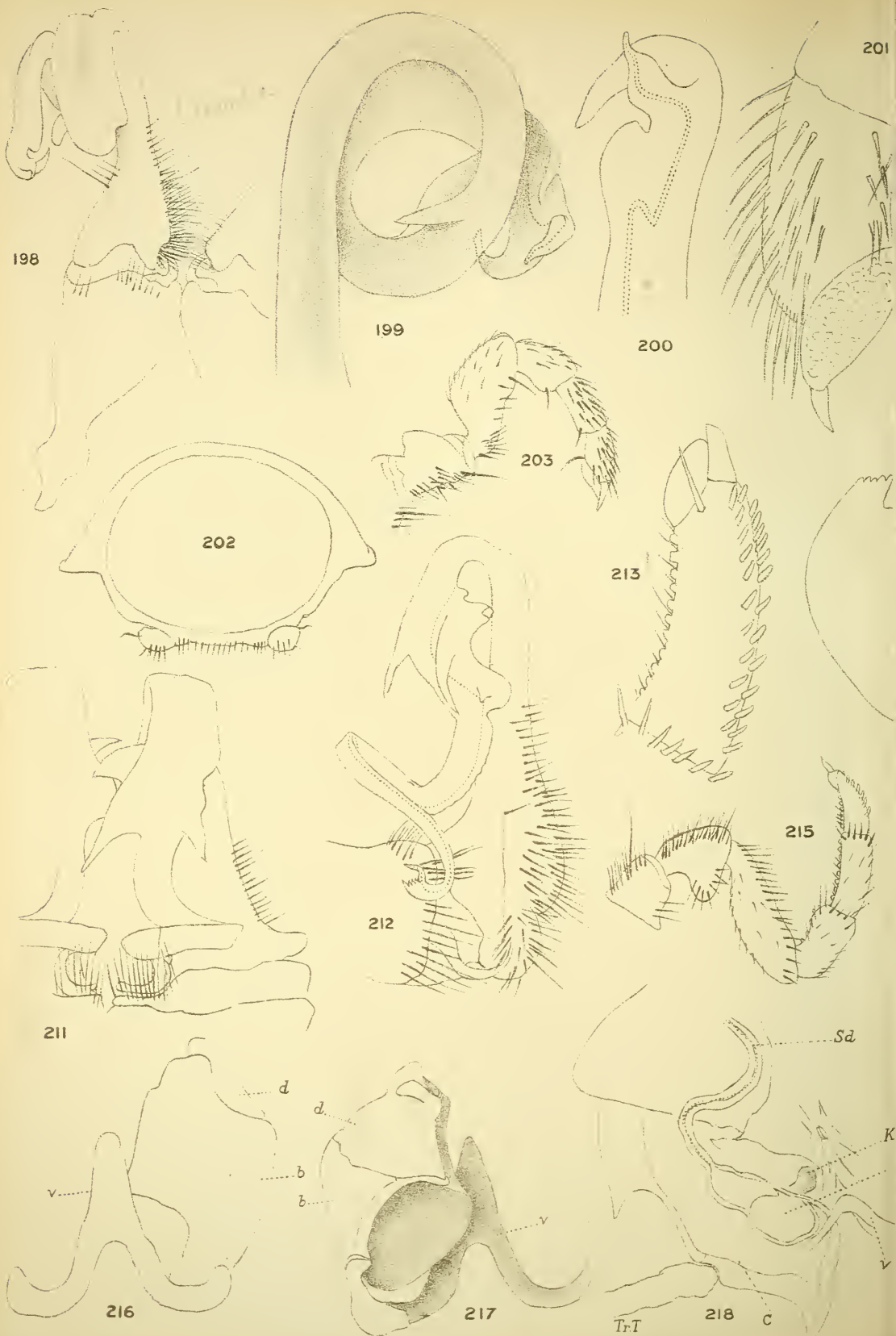
- 221, 222. Anterior gonopod.
- 223. Posterior gonopod.

Mystalides pumilis Att.

- 224. Sense organs on the distal part of the anterior gonopod.

Chersastus silvanus Att.

- 225. Posterior gonopod.



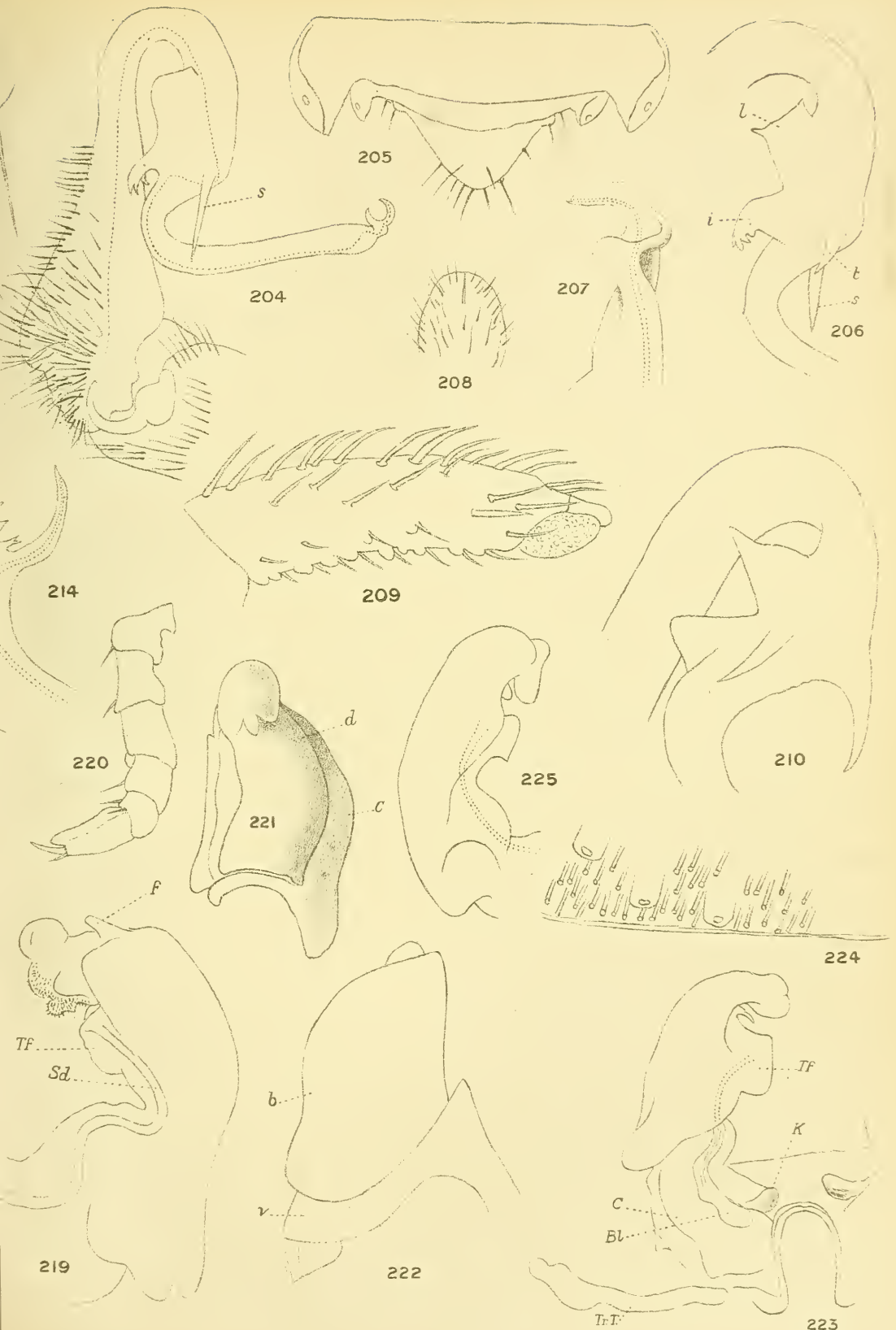


PLATE X.

Chersastus silvanus Att.

226, 227. Anterior gonopods.

Chersastus atrophus Att.

228, 229. Anterior gonopods.

230. Posterior gonopod.

Chersastus inscriptus Att.

231, 232. Anterior gonopods.

233. Part K of distal joint of anterior gonopod, more highly magnified.

234. Posterior gonopod.

235. Telopodite of the posterior gonopod.

Julomorpha kinbergi Por.

236. Coxite of anterior gonopod.

237. Anterior gonopod, another view.

238. Telopodite of the anterior gonopod.

Julomorpha fortis Att.

239. Distal part of the anterior gonopod, oral view.

240. Anterior gonopod, aboral view.

241. Posterior gonopods.

242. Telopodite of anterior gonopod, profile.

Julomorpha rixosa Att.

243. Anterior gonopods, aboral view.

244. Anterior gonopod, oral view.

245. Telopodite of the anterior gonopod, more highly magnified.

246. Posterior gonopods.

Julomorpha cicur Att.

247. Anterior gonopod, distal part.

248. Telopodite of the anterior gonopod.

249, 250. Posterior gonopods.

Julomorpha celer Att.

251. Anterior gonopods.

252. Telopodite of anterior gonopod.

253. Posterior gonopods.

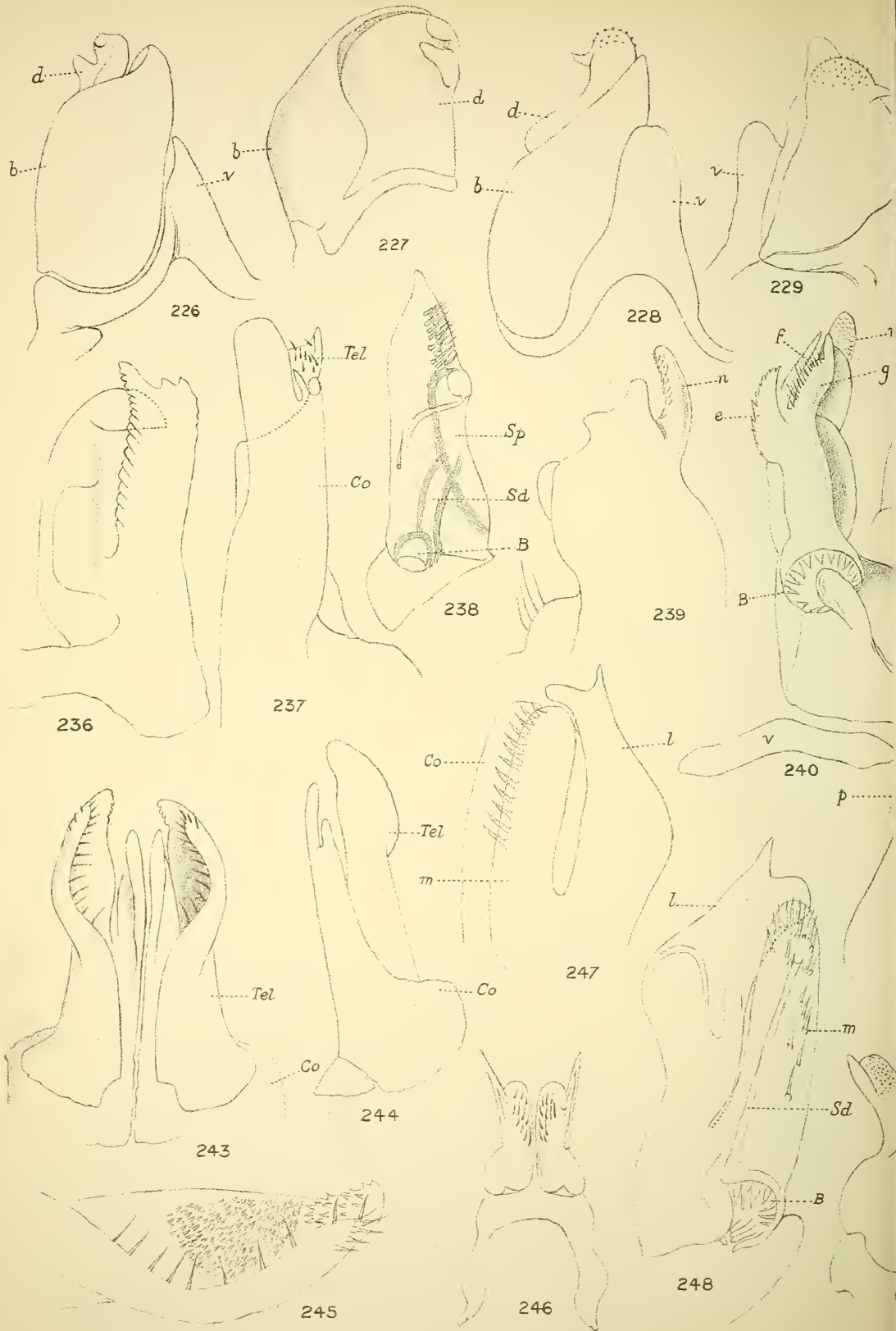
Julomorpha hilaris Att.

254. Telopodite of anterior gonopod.

255. Anterior gonopod.

Julomorpha tarda Att.

256. Posterior gonopod.



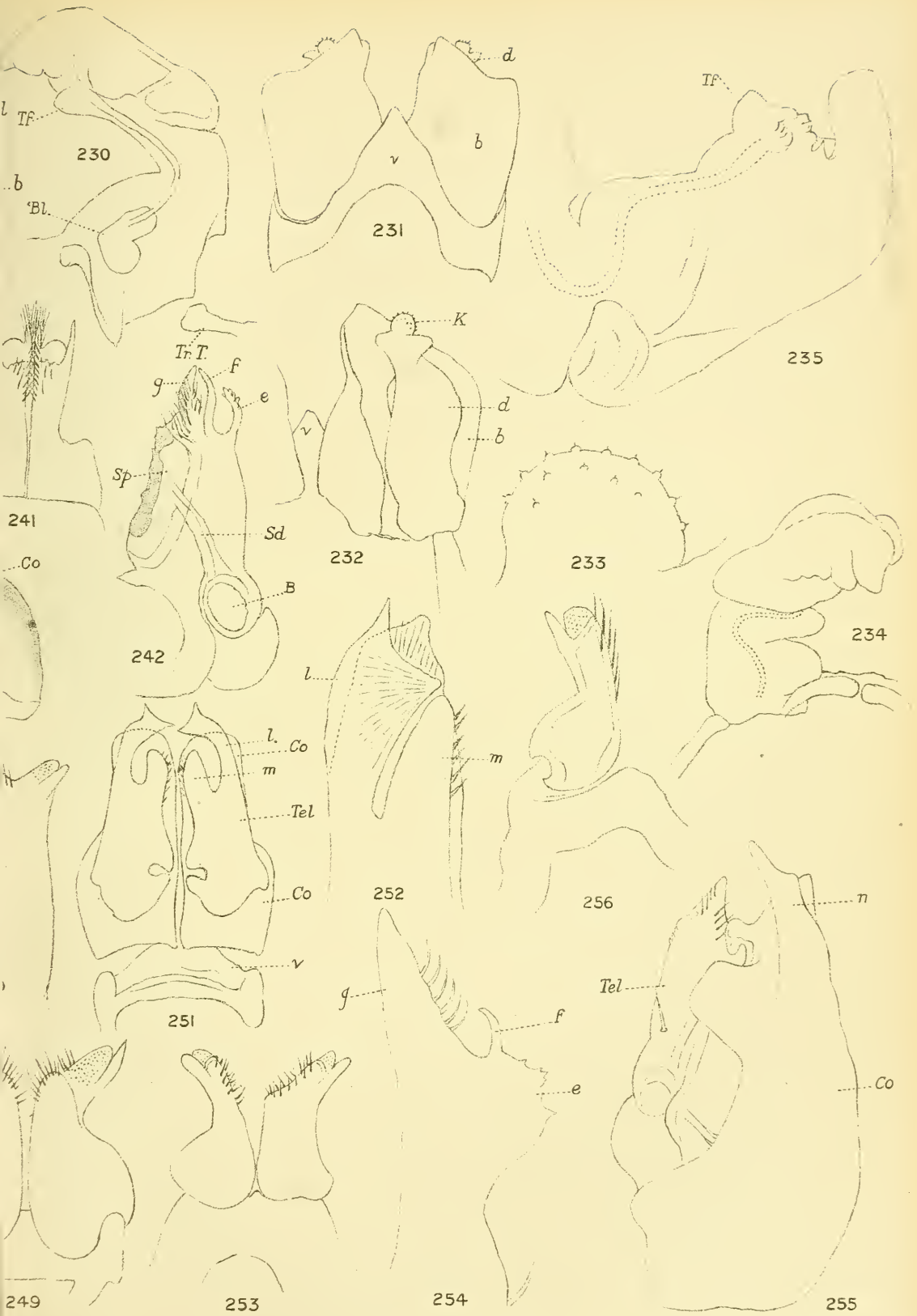


PLATE XI.

Julomorpha tarda Att.

- 257. Telopodite of the anterior gonopod, oral view.
- 258. Tip of the posterior gonopod.
- 259. Anterior gonopods, aboral view.

Julomorpha concors Att.

- 260. Anterior gonopods, oral view.
- 261. Anterior gonopods, aboral view.
- 262. Telopodite of anterior gonopod, more highly magnified.
- 263. The same as fig. 262. The oral lamellae removed to show the inner lobes.
- 264. Posterior gonopod.

Julomorpha ignava Att.

- 265. Anterior gonopod, aboral view.
- 266. Telopodite of the anterior gonopod, oral view, more highly magnified.
- 267. Anterior gonopods, profile of outer side.
- 268. Coxite of the anterior gonopod, inner profile.

Julomorpha tristis Att.

- 269. Anterior gonopod.
- 270. Telopodite of the anterior gonopod.
- 271. Posterior gonopod.

Julomorpha rudis Att.

- 272. Anterior gonopods, coxite and telopodite separate.
- 273. Anterior gonopod, *in situ*.
- 274. Posterior gonopod.

Bicoidens flavicollis Att.

- 275. Gonopods, oral view.
- 276. Posterior gonopod.
- 277. Tip of the anterior gonopod, aboral view.
- 278. Tip of the posterior gonopod.

Bicoidens nigerrimus Att.

- 279. Gonopods, view of outer side.
- 280. Tip of anterior gonopod, aboral view.
- 281. Gonopod, oral view.

Doratogonus capricornis Att.

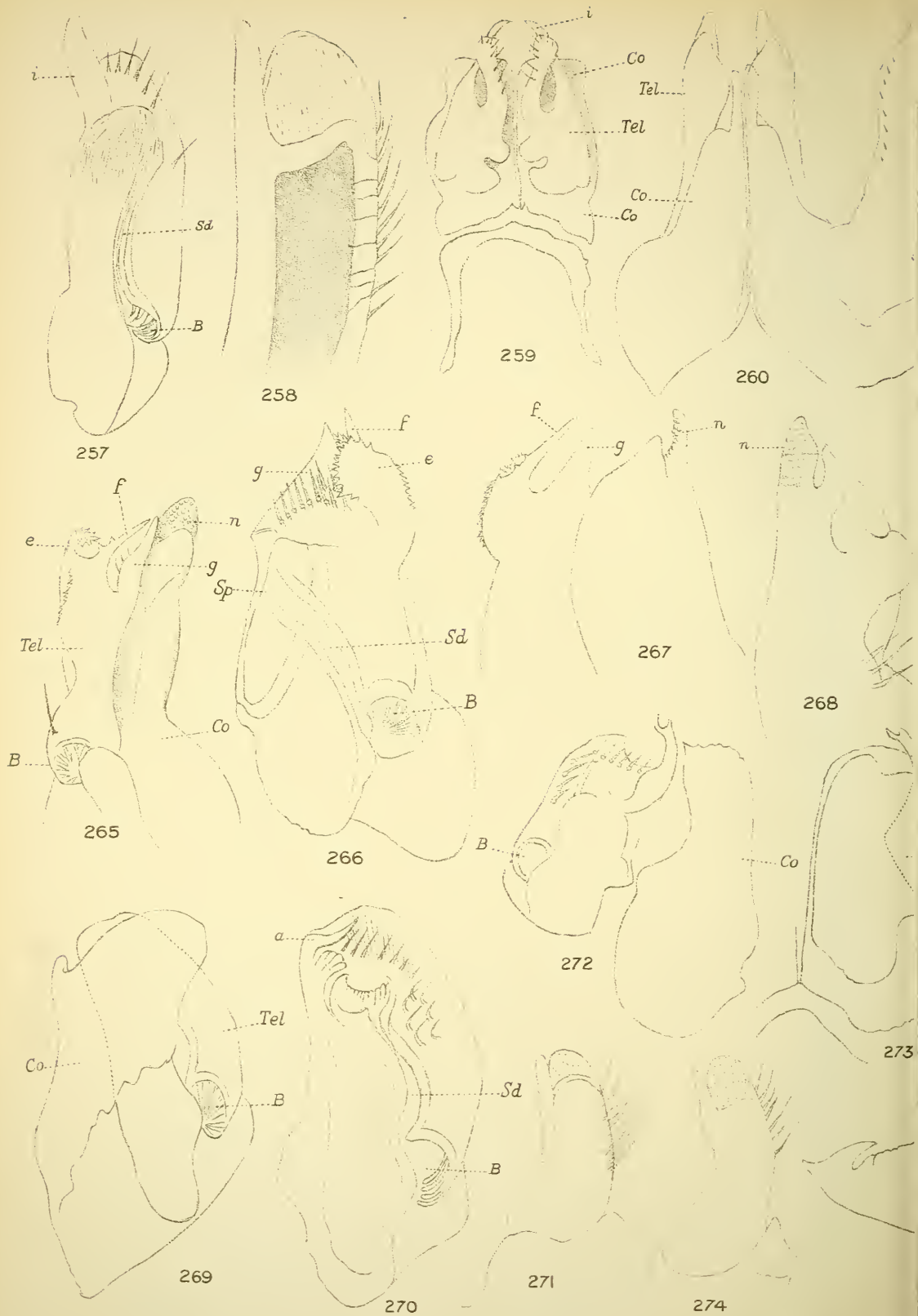
- 282. Anterior gonopod.
- 283. Lateral cone, more highly magnified.
- 284. Posterior gonopod.

Doratogonus flavifilis Pet.

- 285. Anterior gonopod.

Doratogonus xanthopus Att.

- 286. Posterior gonopod.



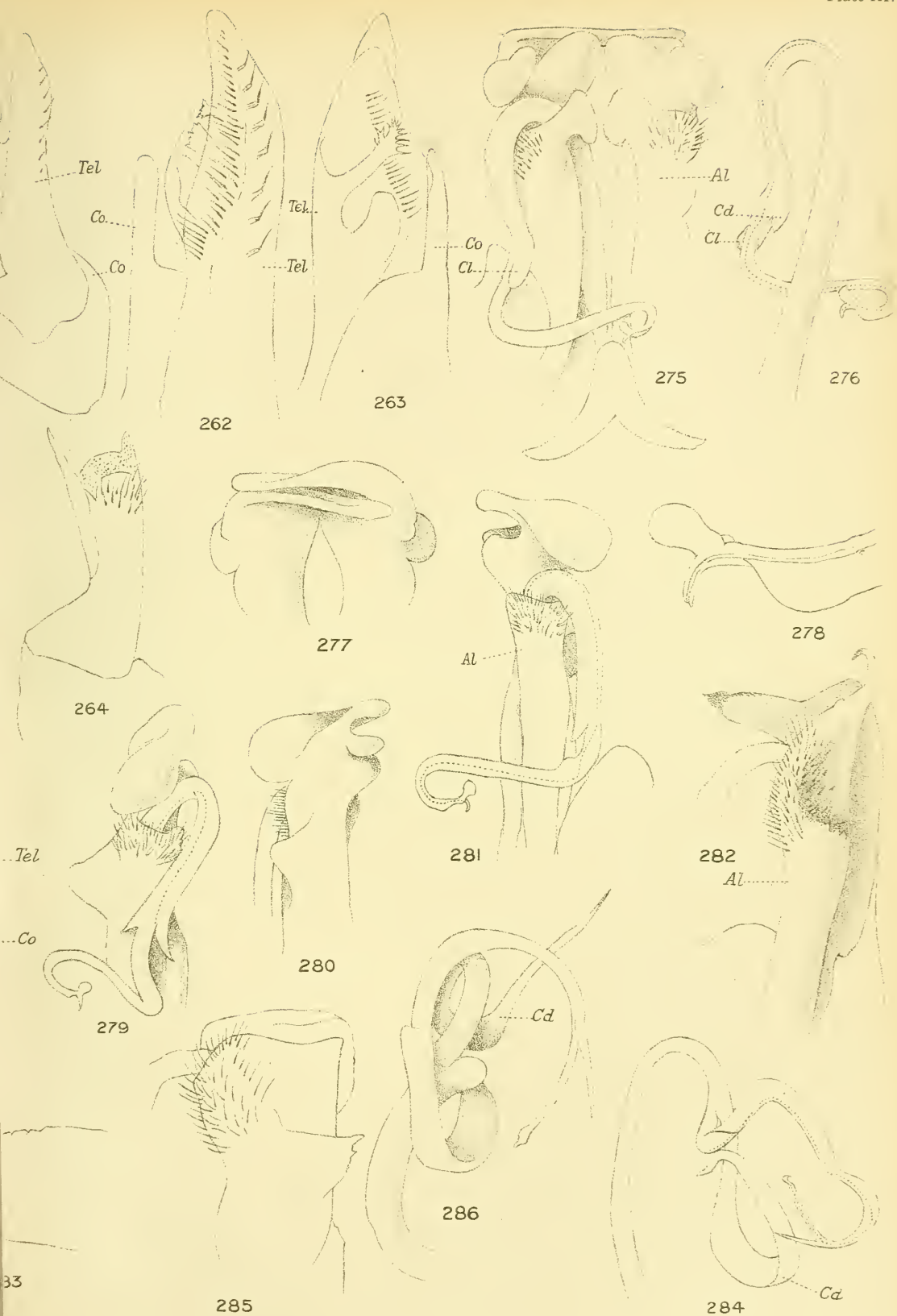


PLATE XII.

Doratogonus xanthopus Att.

287, 288. Posterior gonopod.

Doratogonus annulipes Carl.

289. Anterior gonopod.

Doratogonus setosus uncinatus Att.

290. Anterior gonopods, aboral view.

291. Posterior gonopod.

292. Tip of anterior gonopod, oral view.

Camaricoproctus bombycinus Att.

293. Gonopods.

294. Posterior gonopod, more highly magnified.

Synophryostreptus punctatus Att.

295. Gonopods, oral view.

296. Tip of the posterior gonopod.

297. Seventh leg of ♂.

Alloporus falcatus Att.

298. Posterior gonopod.

299. Collum of ♂; lobe.

300. Anterior gonopod.

Alloporus circulus Att.

301. Anterior gonopod.

Alloporus castaneus Att.

302. Gonopods.

Alloporus levigatus Att.

303. Gonopods.

Alloporus uncinatus Att.

304. Gonopods.

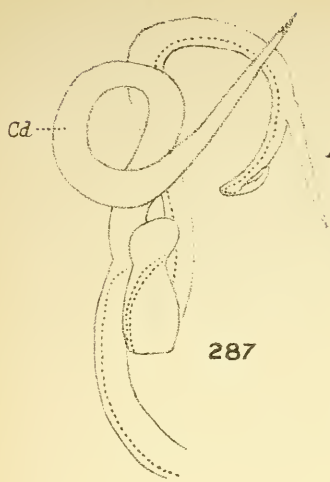
Alloporus rugifrons Att.

305. Posterior gonopod.

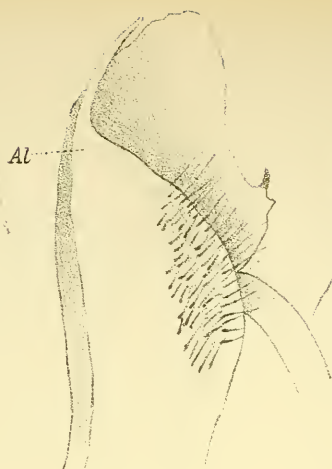
306. Anterior gonopod.

Gymnostreptus pyrrhocephalus Koch.

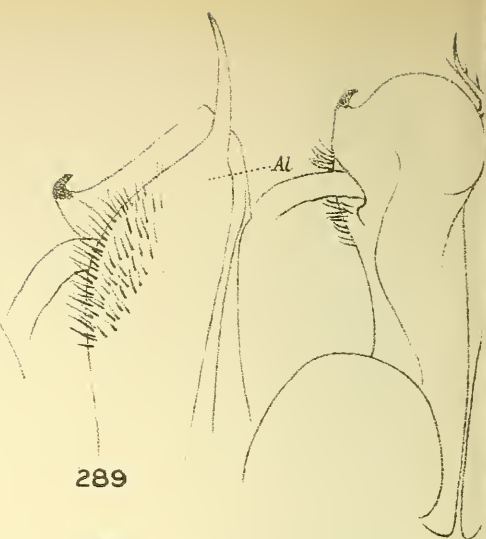
307. Posterior gonopod.



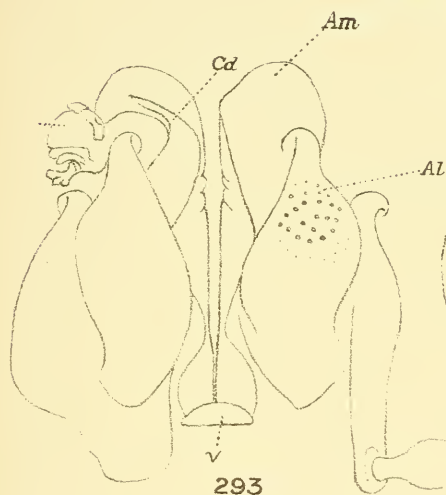
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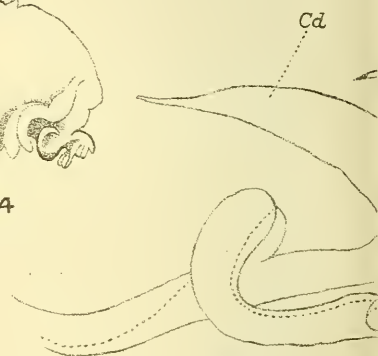
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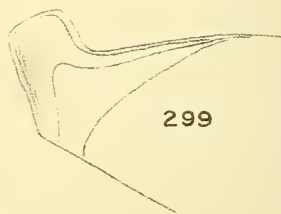
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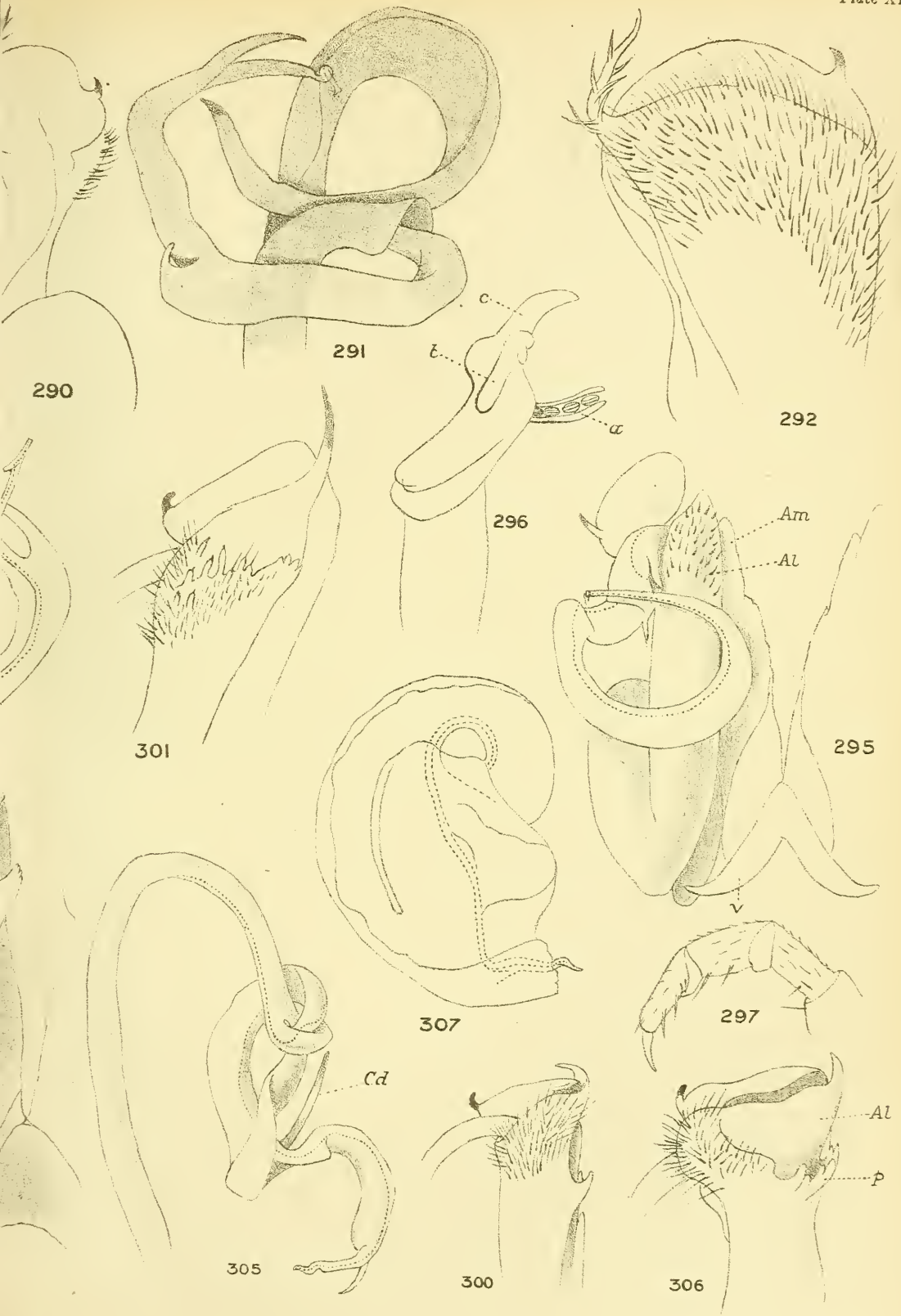


PLATE XIII.

Gymnostreptus pyrrhocephalus Koch.

308. Anterior gonopods.

Gymnostreptus tabulinus Att.

309. Gonopods of specimen from Gouda, Tulbagh Div.

311. Gonopods of specimen from Knysna.

312. Gonopods of specimen from Houw Hoek.

313. Gonopods of specimen from Cape Flats.

314. Posterior gonopod of specimen from Knysna.

Gymnostreptus tabulinus var. *exaratus* Att.

310. Anterior gonopod.

Triaenostreptus krügeri Att.

315. Tip of the posterior gonopod.

316. Anterior gonopod, oral view.

317. Gonopod, aboral view.

Triaenostreptus unciger Att.

318. Gonopods, oral view.

319. Gonopods, aboral view.

320. Tip of the posterior gonopod.

Triaenostreptus petersi Karsch.

321. Anterior gonopod, aboral view.

Triaenostreptus triodus Att.

322. Posterior gonopod.

Harpagophora spirobolina Karsch.

323. Gonopods.

Harpagophora polyodus Att.

324. Anterior gonopod of specimen from Clanwilliam.

325. Anterior gonopod of specimen from Matjesfontein.

Harpagophora dittoktenus Att.

326. Coxite of gonopods.

327. Coxite of gonopods.

Harpagophora levis Att.

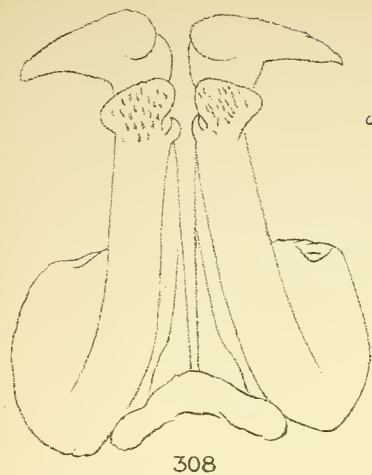
238. Gonopods.

329, 330. Telopodite of the posterior gonopods from opposite sides.

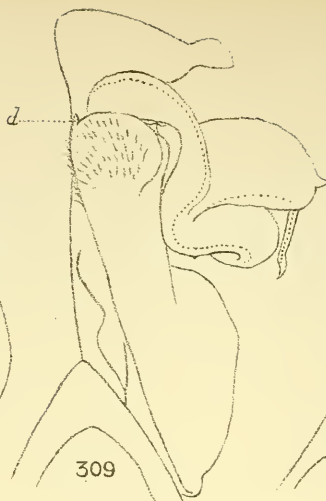
331. Coxal spines of the posterior gonopod.

Poratophilus diplodontus Att.

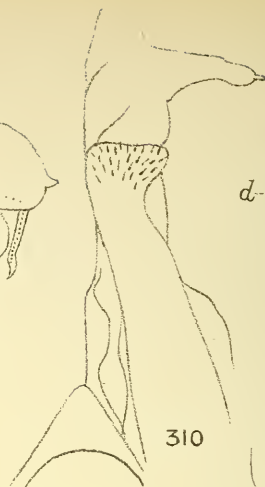
332. Tip of the posterior gonopod.



308



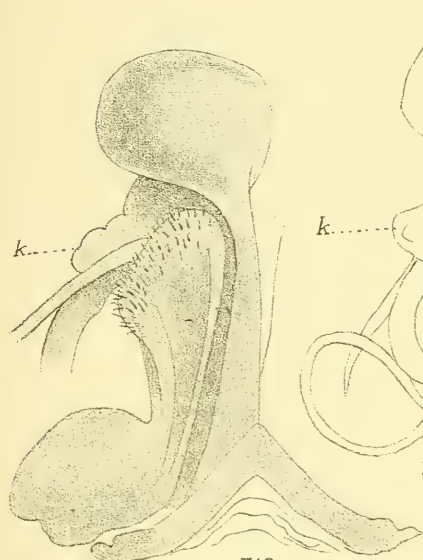
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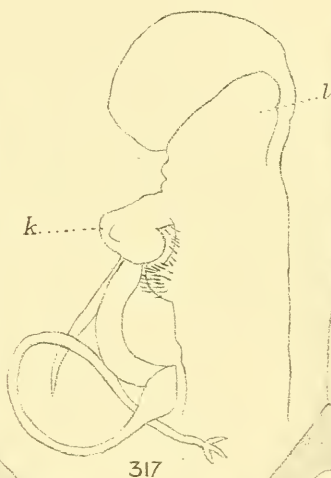
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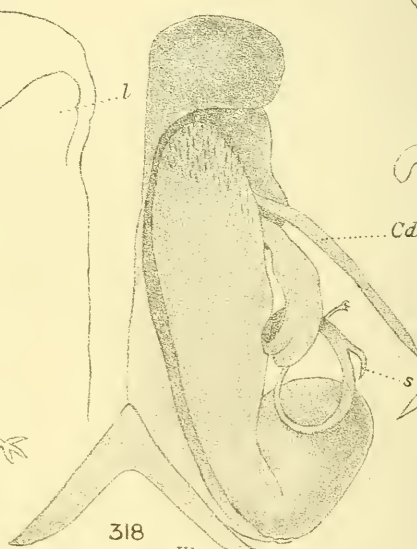
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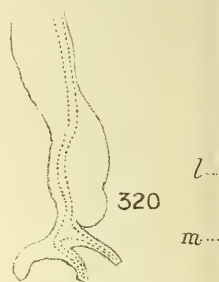
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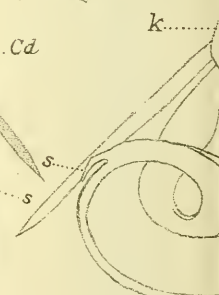
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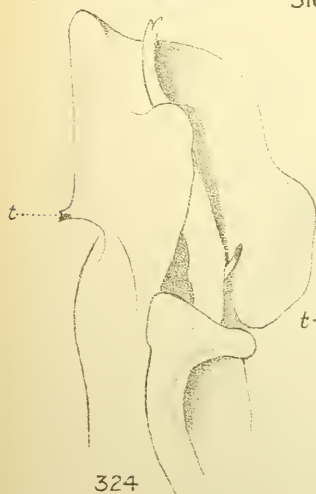
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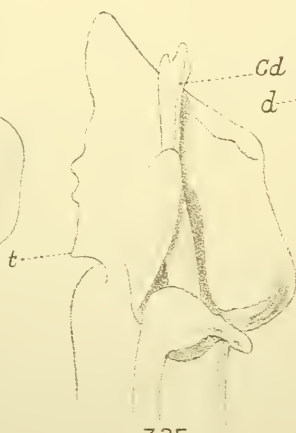
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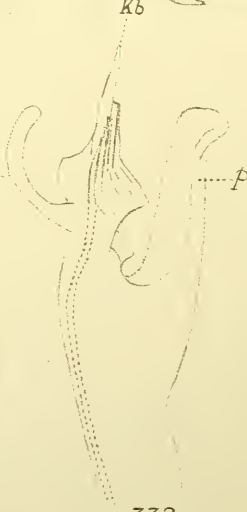
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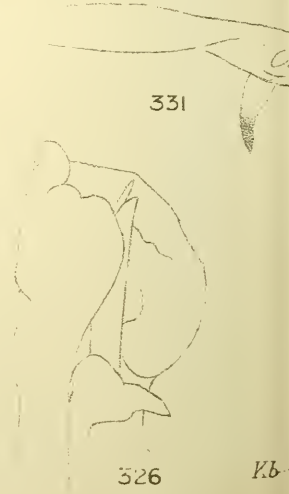
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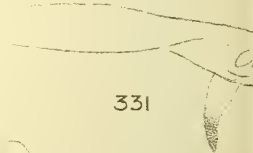
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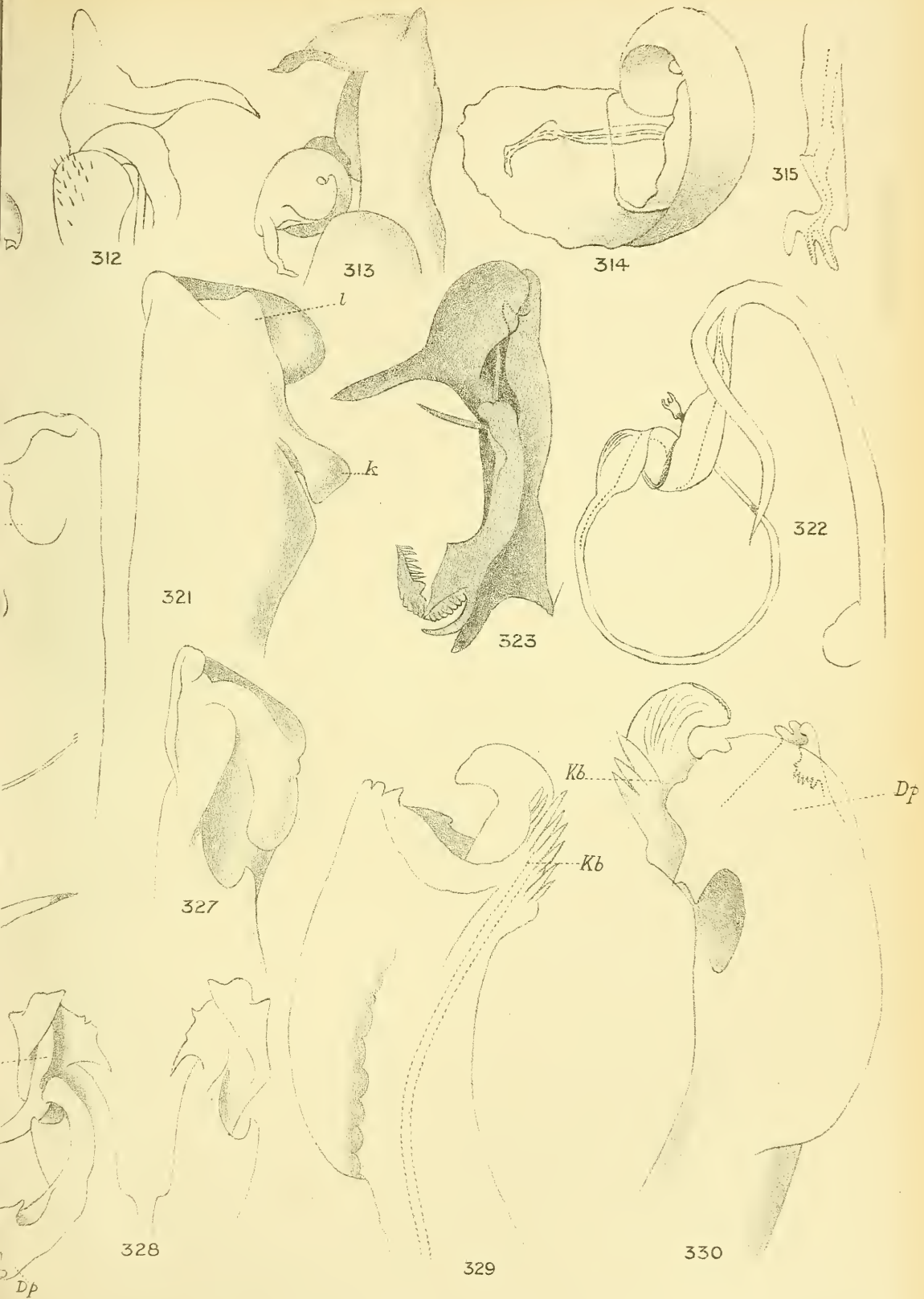


PLATE XIV.

Poratophilus diplodontus Att.

- 333. Gonopods, oral view.
- 334. Tip of anterior gonopod, aboral view.
- 335. Tip of posterior gonopod.

Poratophilus similis Carl.

- 336, 337. Anterior gonopod.
- 338. Tip of the posterior gonopod.

Poratophilus brevilobatus Att.

- 339, 340. Anterior gonopod.
- 341, 342. Tip of the posterior gonopod.

Poratophilus sabulosus Att.

- 343, 345. Tip of the posterior gonopod.
- 344, 346. Anterior gonopod.

Poratophilus robustus Att.

- 347. Gonopods.
- 348, 349. Tip of the posterior gonopod.
- 350. Anterior gonopod, aboral view.

Poratophilus punctatus Att.

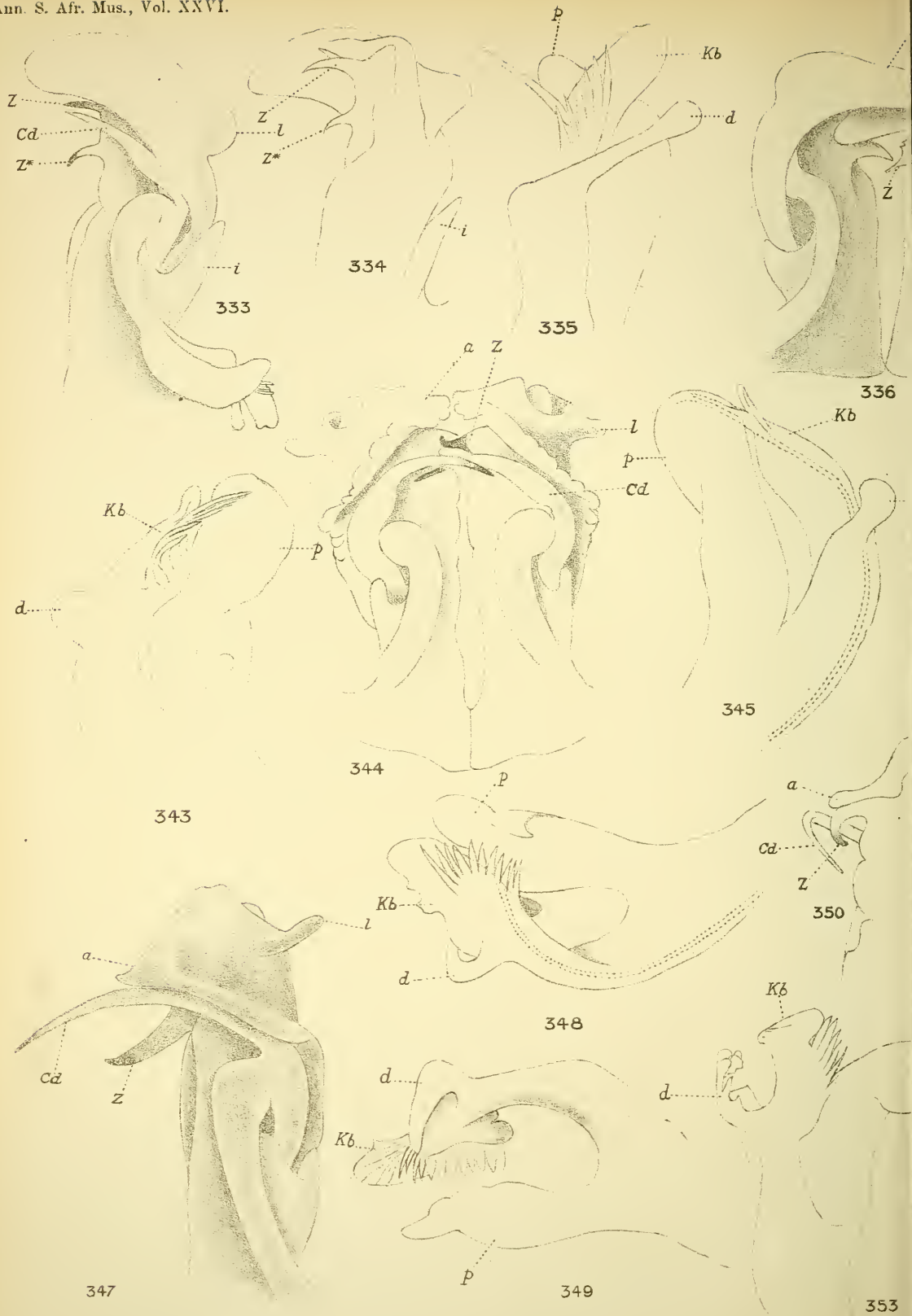
- 351. Anterior gonopod.
- 352. Gonopods.
- 353, 354. Tip of the posterior gonopod.

Poratophilus junodi Carl.

- 355, 356. Gonopods.

Odontopyge trifolia Att.

- 357. Anterior gonopod.
- 358. Posterior gonopod.



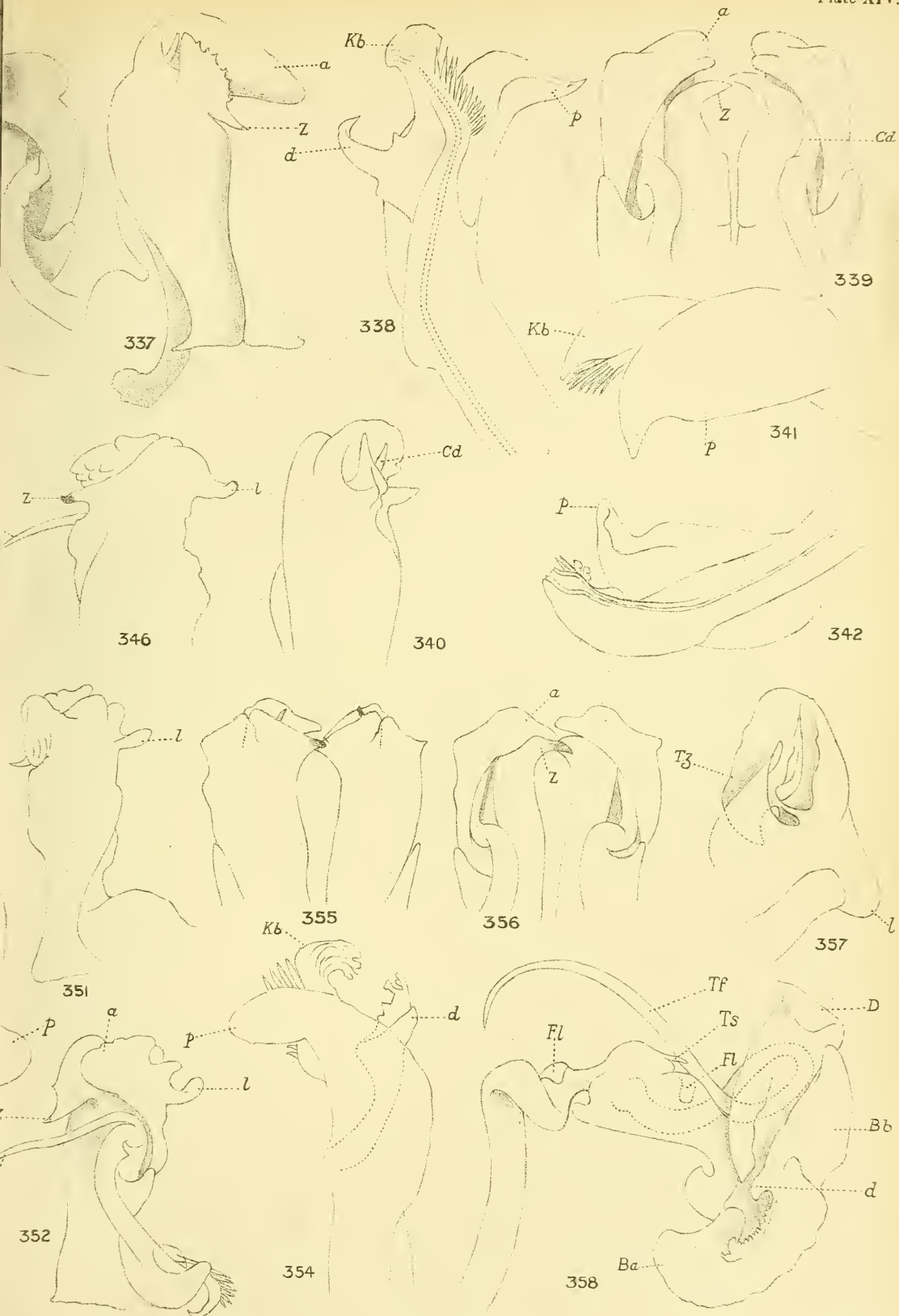


PLATE XV.

Odontopyge trifolia Att.

- 359. Marginal fringes.
- 360. Anterior gonopod.

Haplothysanus colosseus Att.

- 361. Posterior gonopods.
- 362. Anterior gonopod.
- 363. Marginal fringes.

Haplothysanus serratus Att.

- 364. Anterior gonopod.
- 365. Posterior gonopod.
- 366. Marginal fringes.

Spinotarsus tenuis Att.

- 367, 368. Gonopods.
- 369. Spines of the basal lobe of the tarsus of posterior gonopod.
- 370. Marginal fringes.

Spinotarsus striolatus Att.

- 371. Posterior gonopod.
- 372. Anterior gonopod.
- 373. Marginal fringes.

Patinatius inermis Att.

- 374. Gonopods.
- 375. Tarsus of the posterior gonopod.
- 376. Marginal fringes.

Ardiophyllum debile Att.

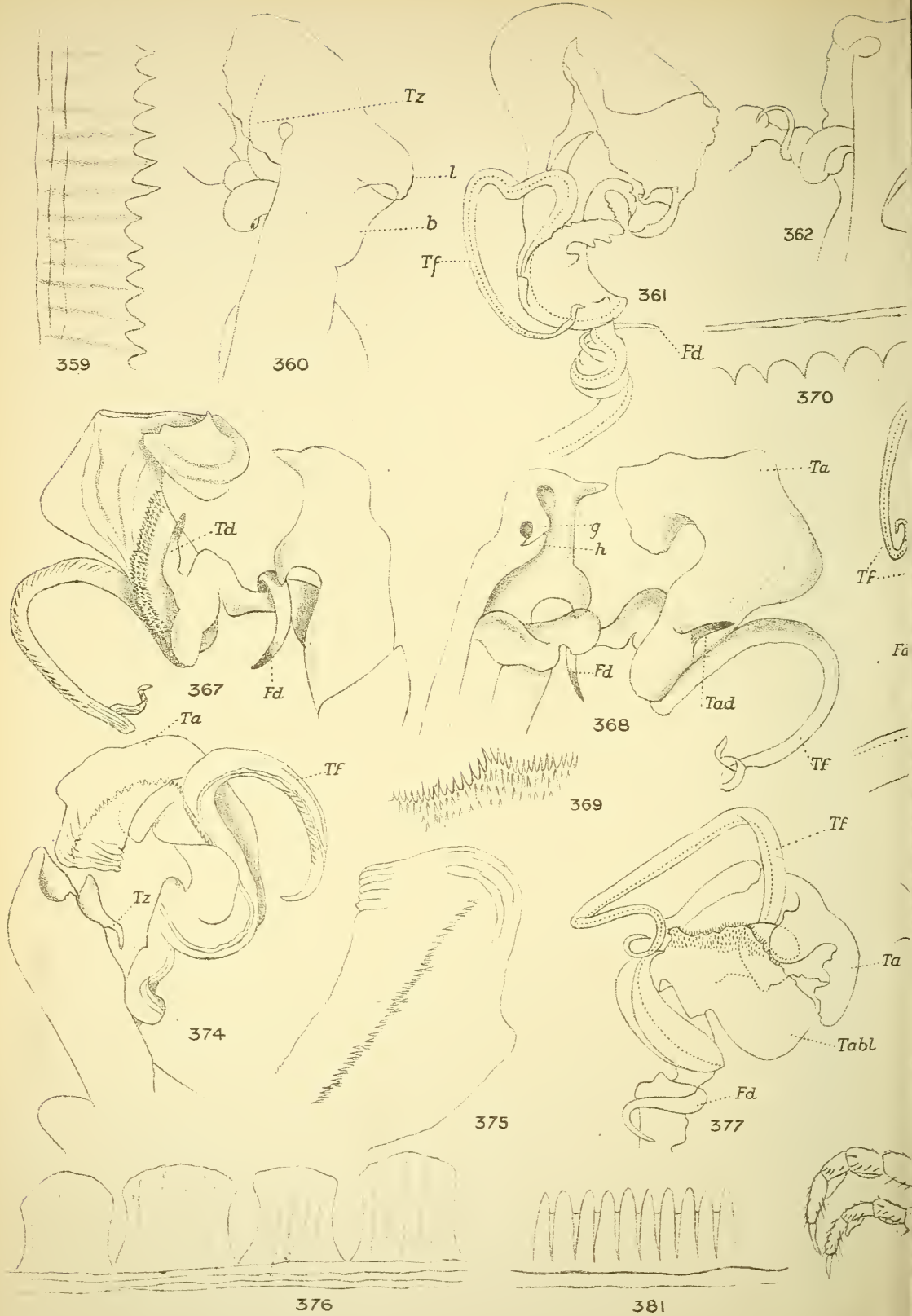
- 377. Posterior gonopod.
- 378. Anterior gonopod.

Ardiophyllum liberale Att.

- 379. Posterior gonopods.
- 380. Anterior gonopod.
- 381. Marginal fringes.

Ardiophyllum matabelinum Att.

- 382. Anterior gonopod.
- 383. Sixth and seventh leg of ♂.
- 384. Base of the gonopods.



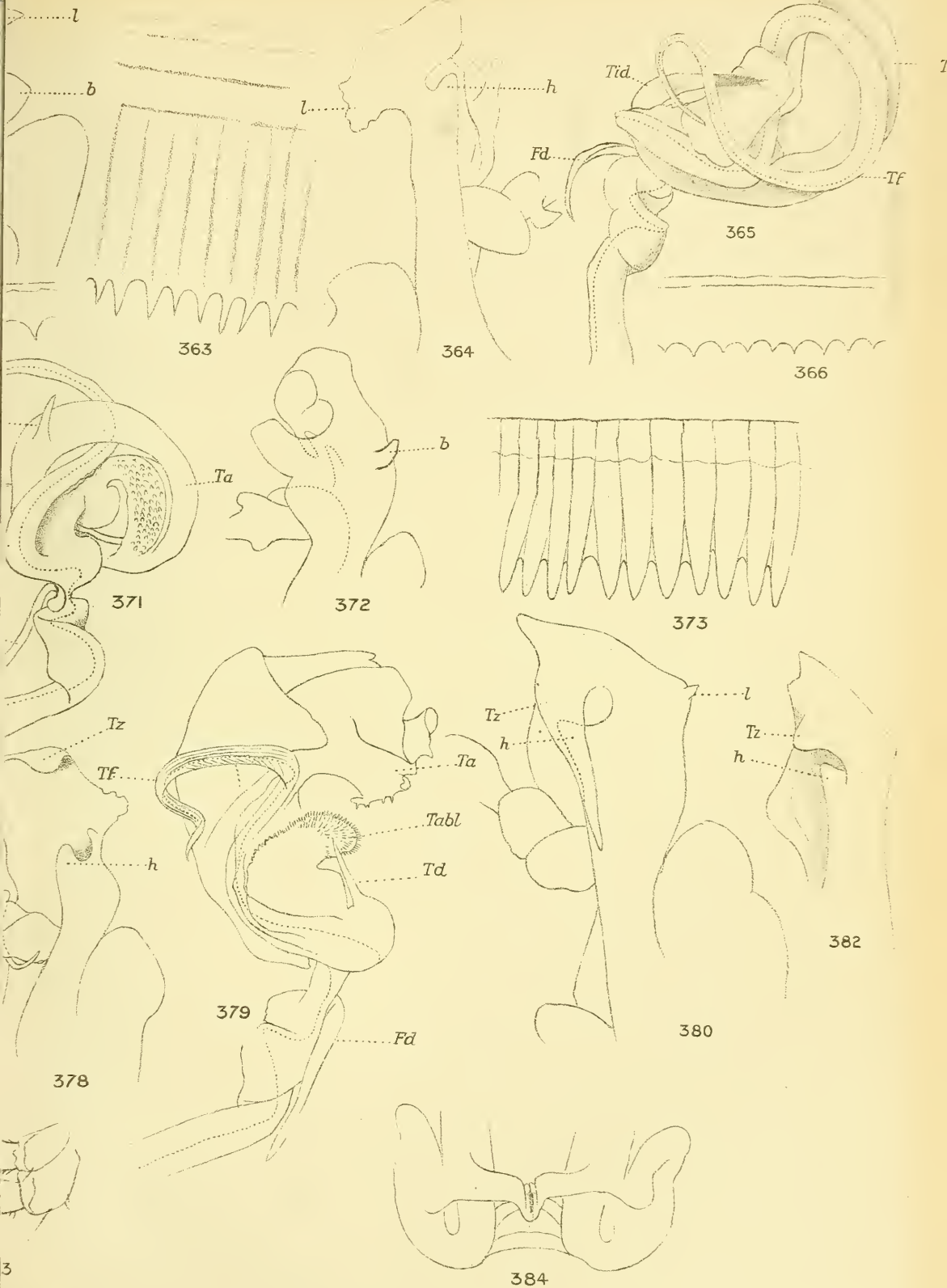


PLATE XVI.

Ardiophyllum matabelinum Att.

385. Gonopods.

Storthophorus vallatus Att.

- 386, 387. Gonopods from opposite sides.
388. Tibial process of the posterior gonopod.
389. Marginal fringes.

Storthophorus levifrons Att.

390. Posterior gonopod.
391. Anterior gonopod.
392. Tarsus of the posterior gonopod.

Storthophorus denticulatus Att.

- 393, 394. Anterior gonopod from the aboral and oral sides.
395. Posterior gonopod.
396. Part of the tarsus of the posterior gonopod.

Storthophorus delagoanus Att.

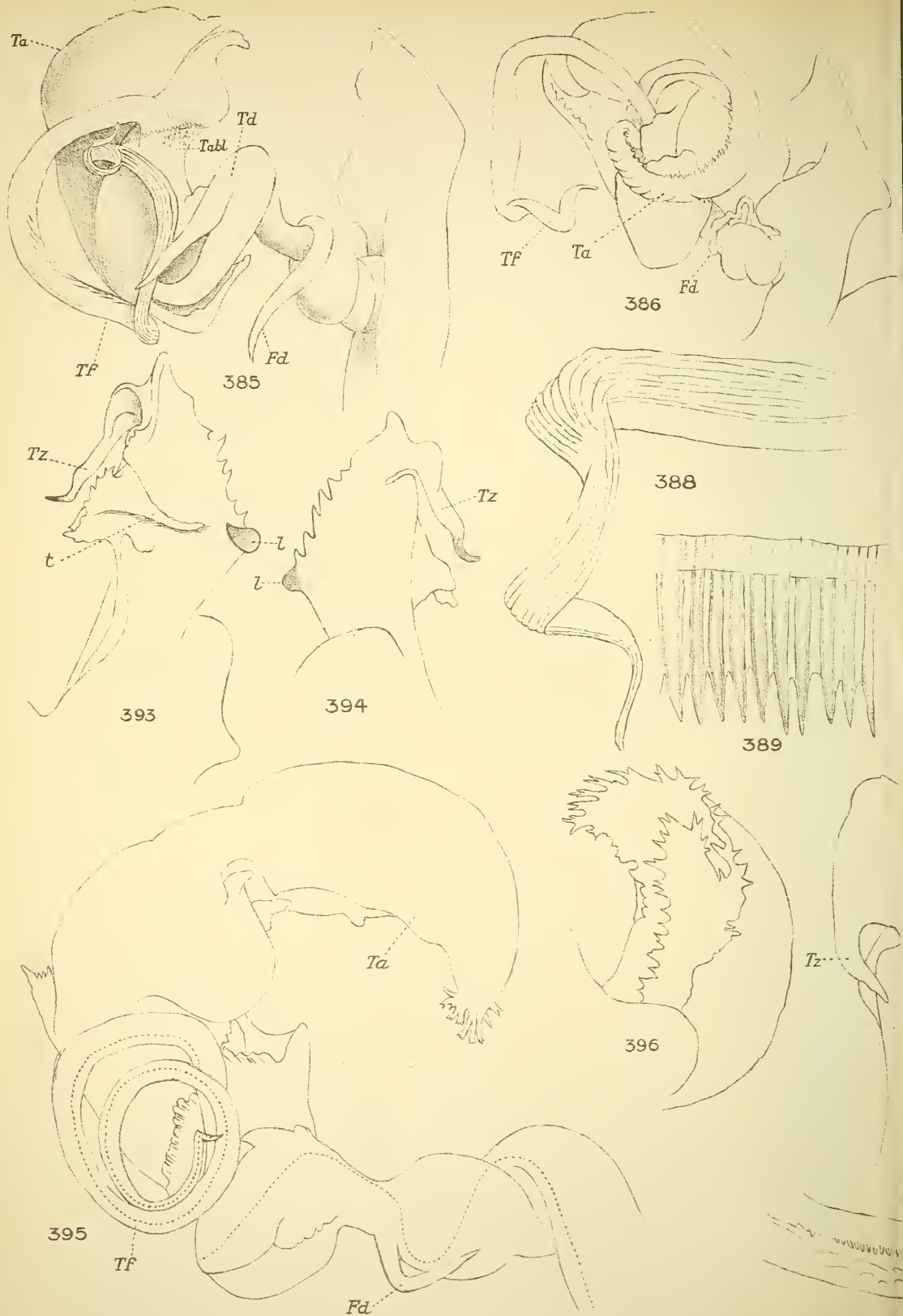
397. Gonopods.
398. Anterior gonopod, opposite view.
399. Tarsus of the posterior gonopod.

Chaleponcus solitarius Att.

400. Gonopods.
401. Distal part of posterior gonopod-tarsus.

Chaleponcus limbatus Att.

402. Anterior gonopod.



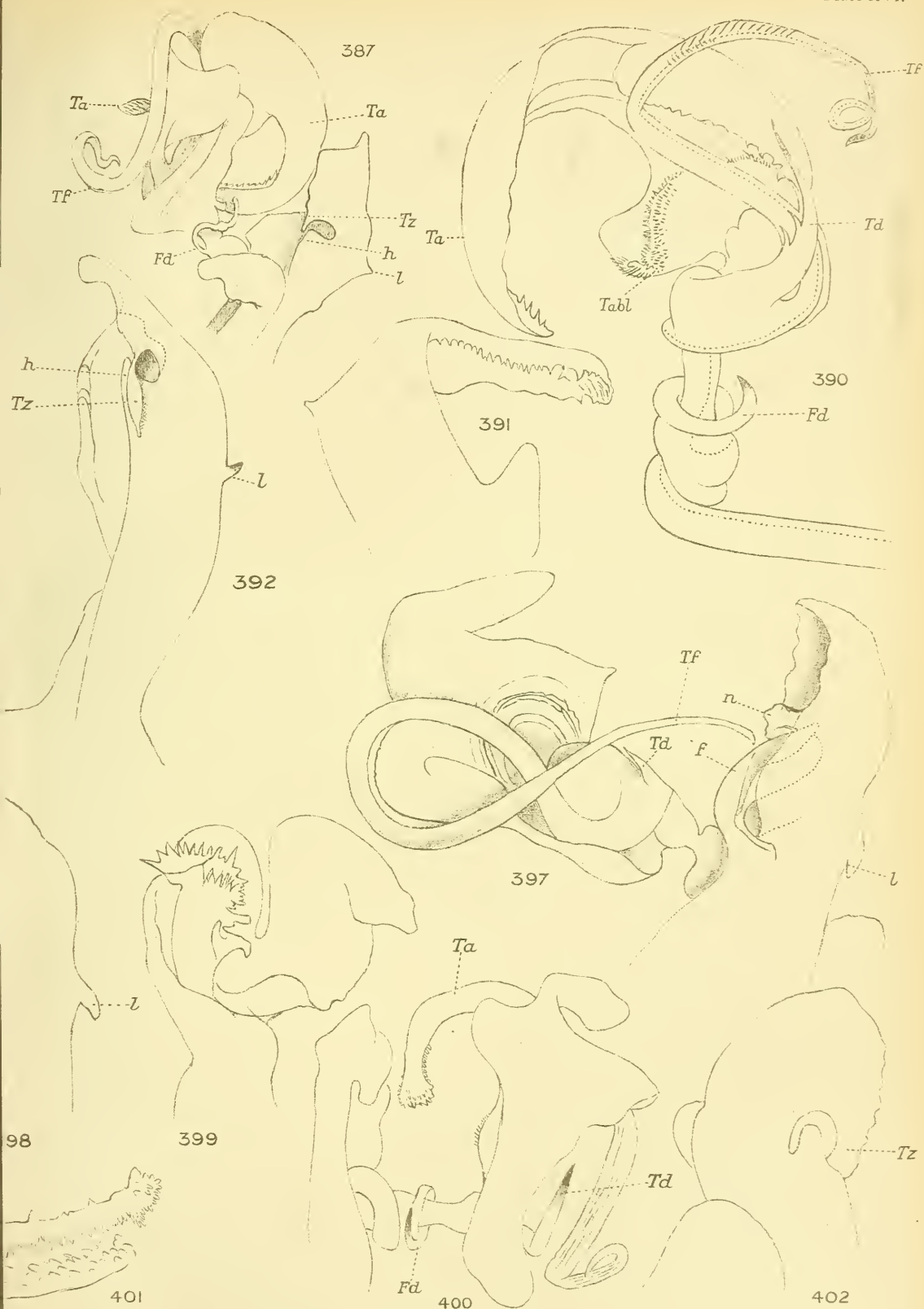


PLATE XVII.

Chaleponcus limbatus Att.

- 403. Marginal fringes.
- 404. Anterior gonopod.
- 405. Tarsus of the posterior gonopod.
- 406. Posterior gonopod.

Chaleponcus solitarius Att.

- 407. Posterior gonopod.

Chaleponcus acanthophorus Att.

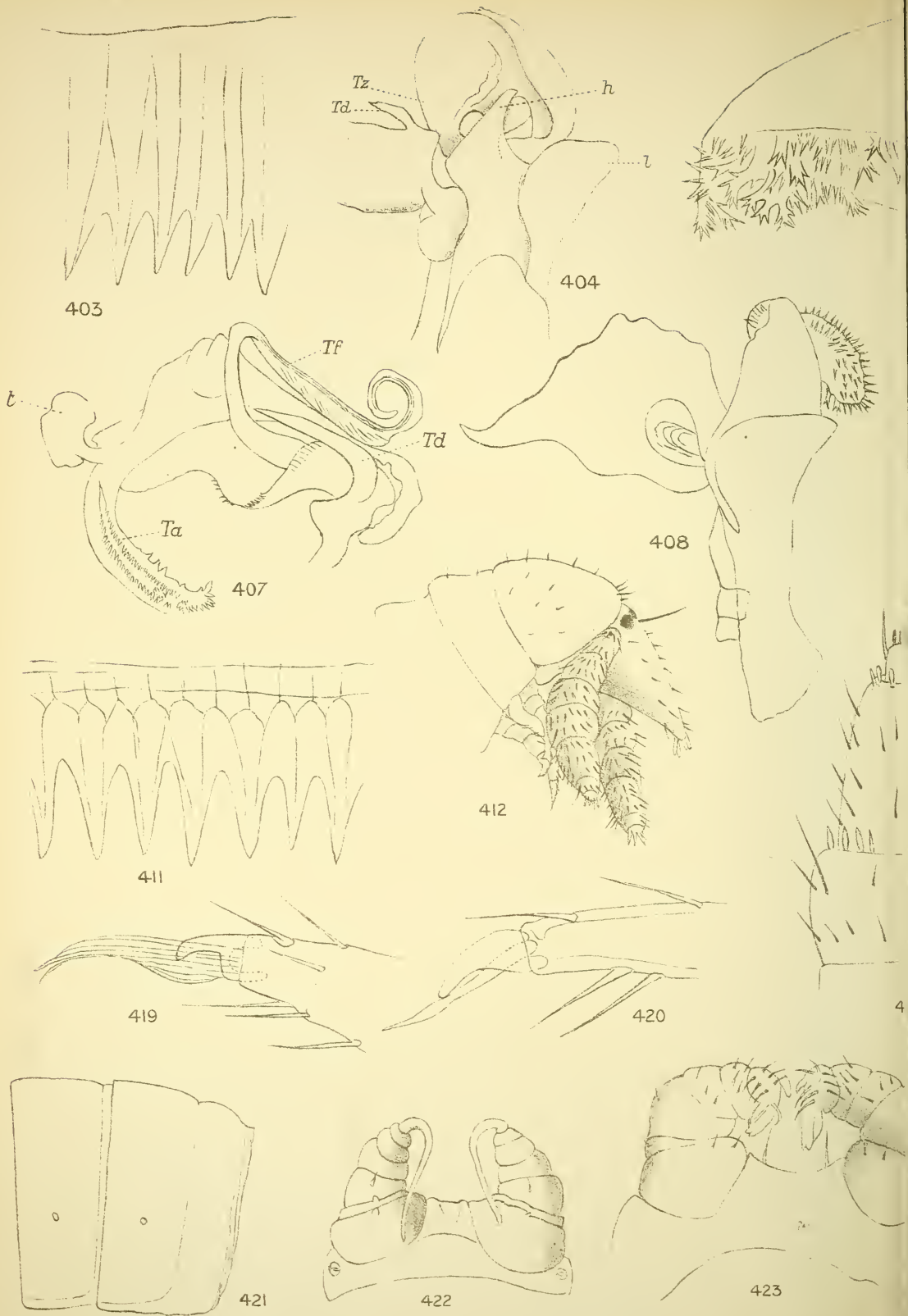
- 408, 409. Tarsus of the posterior gonopod from opposite sides.
- 410. Anterior gonopod and tibia of posterior gonopod.
- 411. Marginal fringes.

Burenia nasuta Att.

- 412. Head, profile.
- 413. Distal joints of the antennae.
- 414, 415. Distal joints of the anterior gonopod.
- 416. Second leg of the ♂.
- 417. Posterior gonopod.
- 418. The tip, more highly magnified.
- 419. Last tarsus of the second leg of the ♂.
- 420. The same, the twenty-fifth leg.
- 421. Two segments of the middle of the body, profile, ♂.
- 422. Posterior gonopods, oral view.
- 423. Anterior gonopods, oral view.
- 424. Posterior end, ventral view.

Schindalmonotus hystrix Att.

- 425. Head, ventral view.
- 426. Antennae.



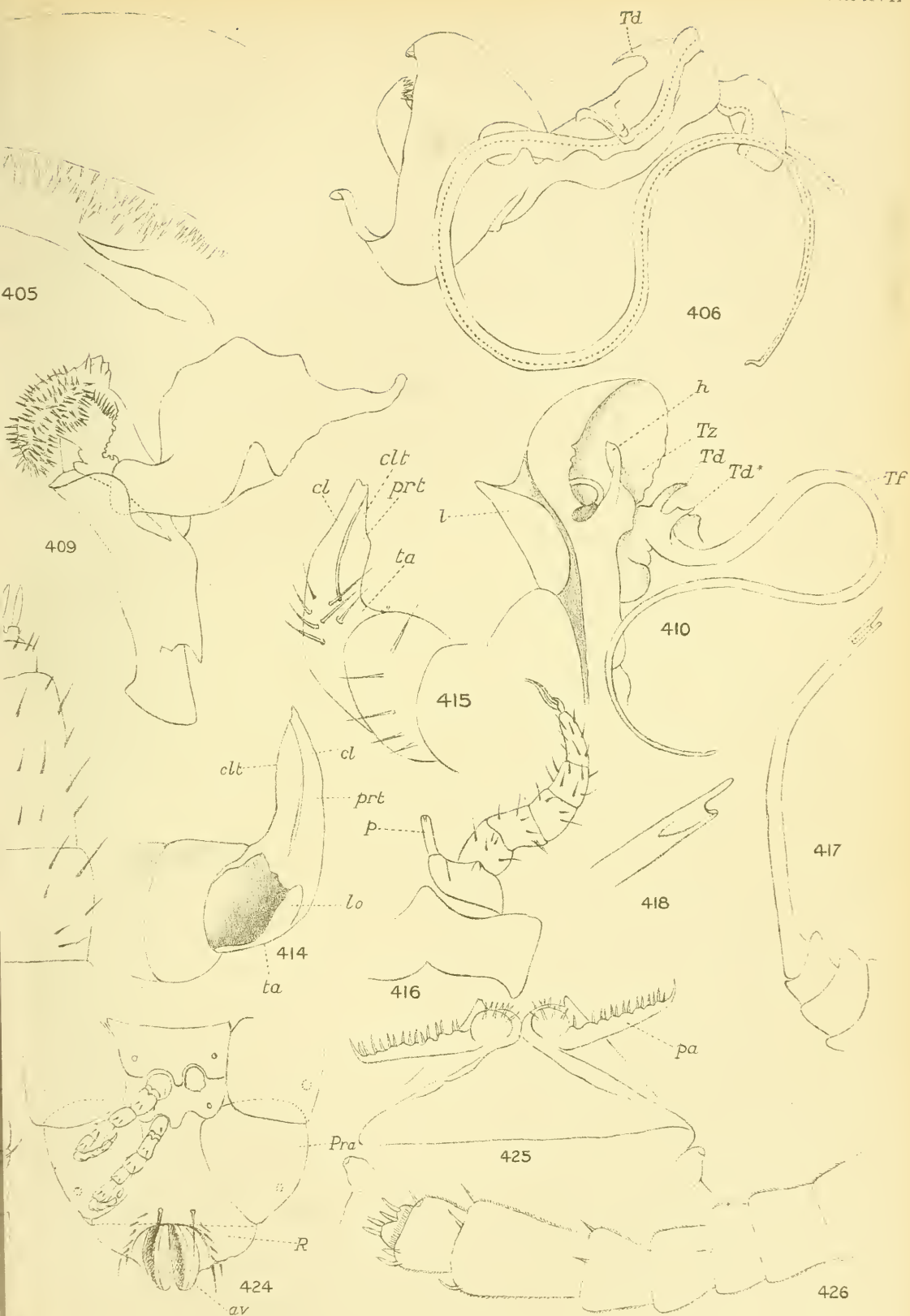


PLATE XVIII.

Archiulus moreleti Por.

- 427. Gonopods, aboral view.
- 428. Gonopods, profile view of outer side.
- 429. Anterior gonopod, aboral view.
- 430. Mesomerite of the posterior gonopod.
- 431. Solaenomerite of the posterior gonopod.
- 432. First leg of the ♂.

Scutigera coleoptrata natalensis Verh.

- 433. Posterior end, ♂.

Scutigera weberi Silv.

- 434. First maxillae, coxal process.
- 435. Bristles of the terminal joint of the first maxillae.
- 436. First maxillae.
- 437. Tibia of the twelfth leg.
- 438. Praefemur of the second maxillae.
- 439. Posterior end of ♂, dorsal view. *Tp*, tergite of praegenital segment.
- 440. Posterior end of ♂, ventral view. *vp*, sternite of praegenital segment.
- 441. Posterior end of ♀, dorsal view.
- 442. Posterior end of ♀, ventral view.
- 443. Male gonopods. *bp*, gonopods of praegenital segment; *bg*, gonopod of genital segment; *vp*, sternite of praegenital segment; *Tels*, Telson.

Paralamyctes spenceri Poc.

- 444. Labrum.
- 445. Posterior end of the body of the ♀, profile.
- 446. Bristles of the labrum.
- 447. Distal joint of second maxillae.
- 448. Bristles of the mandible.
- 449. Terminal joint of the first maxillae.
- 450. First maxillae.

Anopsobius patagonicus calcaratus Att.

- 451. Maxillipedes.
- 452. Distal joints of male gonopods.
- 453. Bristle of the fifteenth coxa.

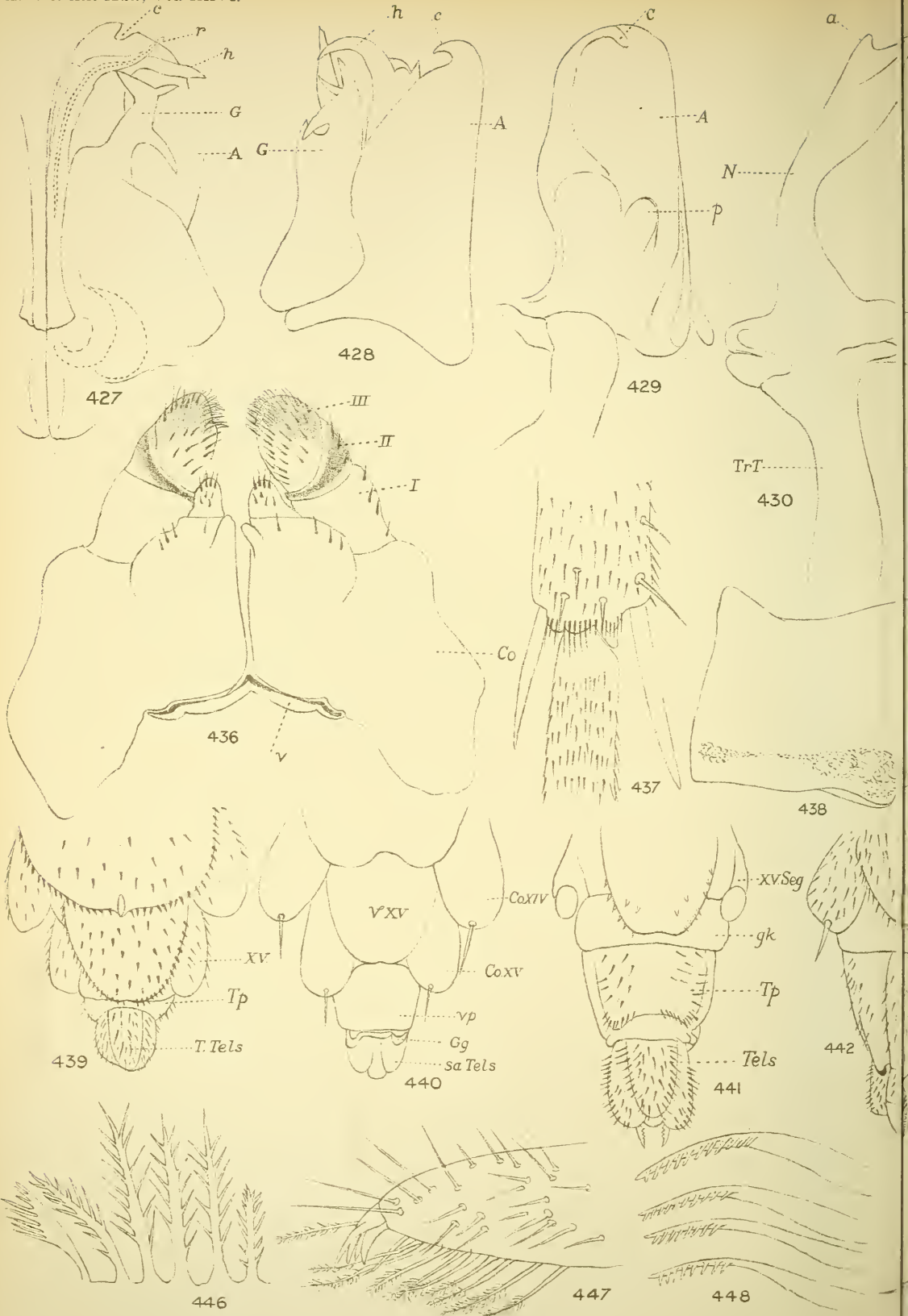




PLATE XIX.

Anopsobius patagonicus calcaratus Att.

454. First maxillae.

Lamyctes africana Por.

455. First maxillae.

456. Labrum.

Mesoschendyla caledonica Att.

457. Maxillae.

458. Posterior end of ♀, ventral view.

459. Mandible.

460. Claw of the second maxilla.

Aspidopleres intercalatus Por.

461. Second maxilla.

462. Lateral lobe of the coxite of the first maxilla.

463. Claw of the second maxilla.

464. Labrum.

Orya barbarica Gerv.

465. Maxillae.

466. First maxillae, more highly magnified.

Ballophilus braunsi Silv.

467. Claw of the second maxilla.

Schendylurus polypus Att.

468. Maxillae.

469. Claw of the second maxilla.

Polygonarea monospathis Att.

470. Labrum.

Eurytion dolichocephalus Att.

471. Labrum.

Geoperingueyia conjungens Att.

472. Labrum.

473. Posterior end of ♂, ventral view.

474. Maxillipedes.

475. Distal joint of the second maxilla.

476. Second maxillae.

Eurytion trichopus Att.

477. Maxillae.

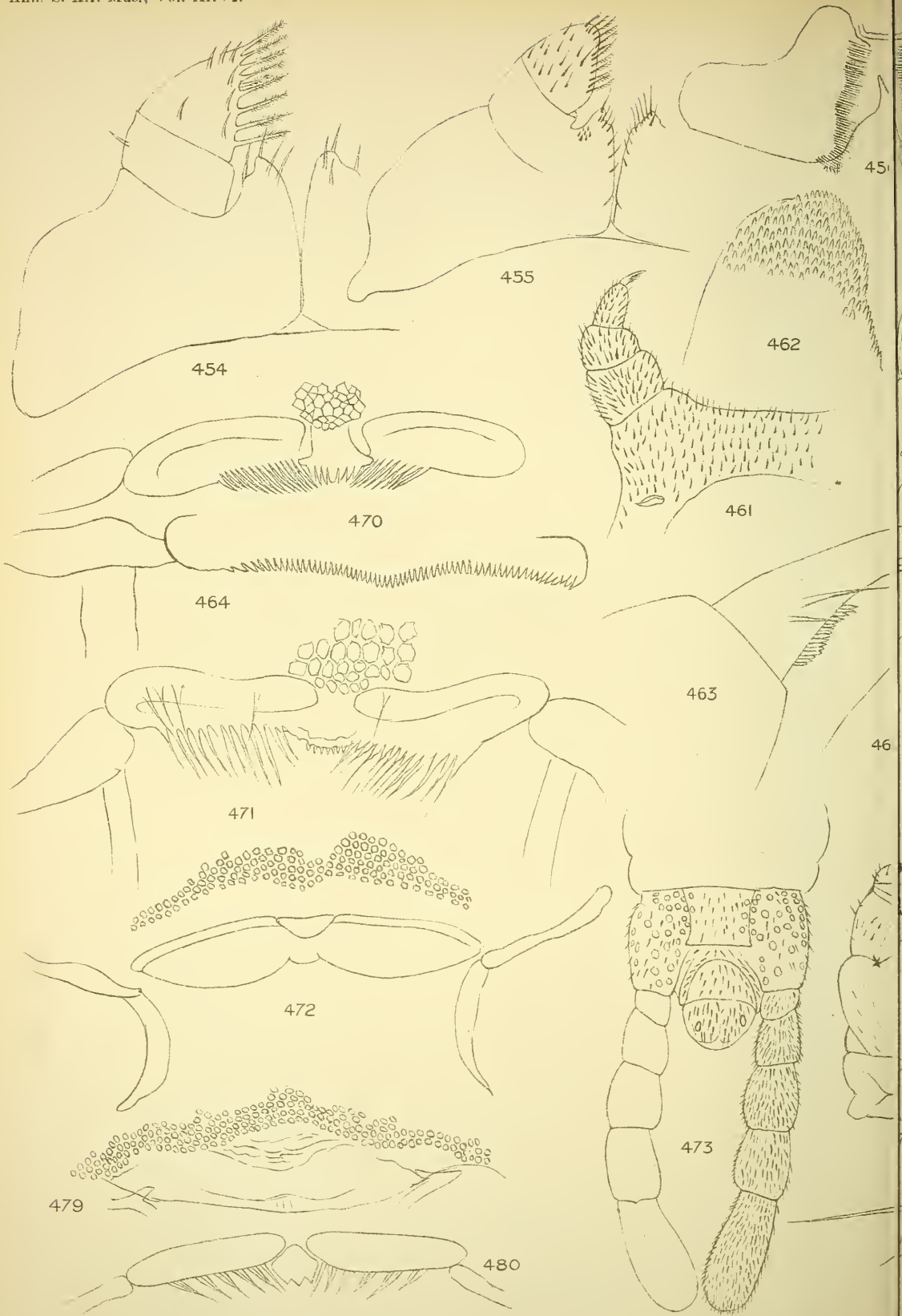
478. First maxillae.

Aphilodon weberi Silv.

479. Labrum.

Purcellinus robustus Att.

480. Labrum.



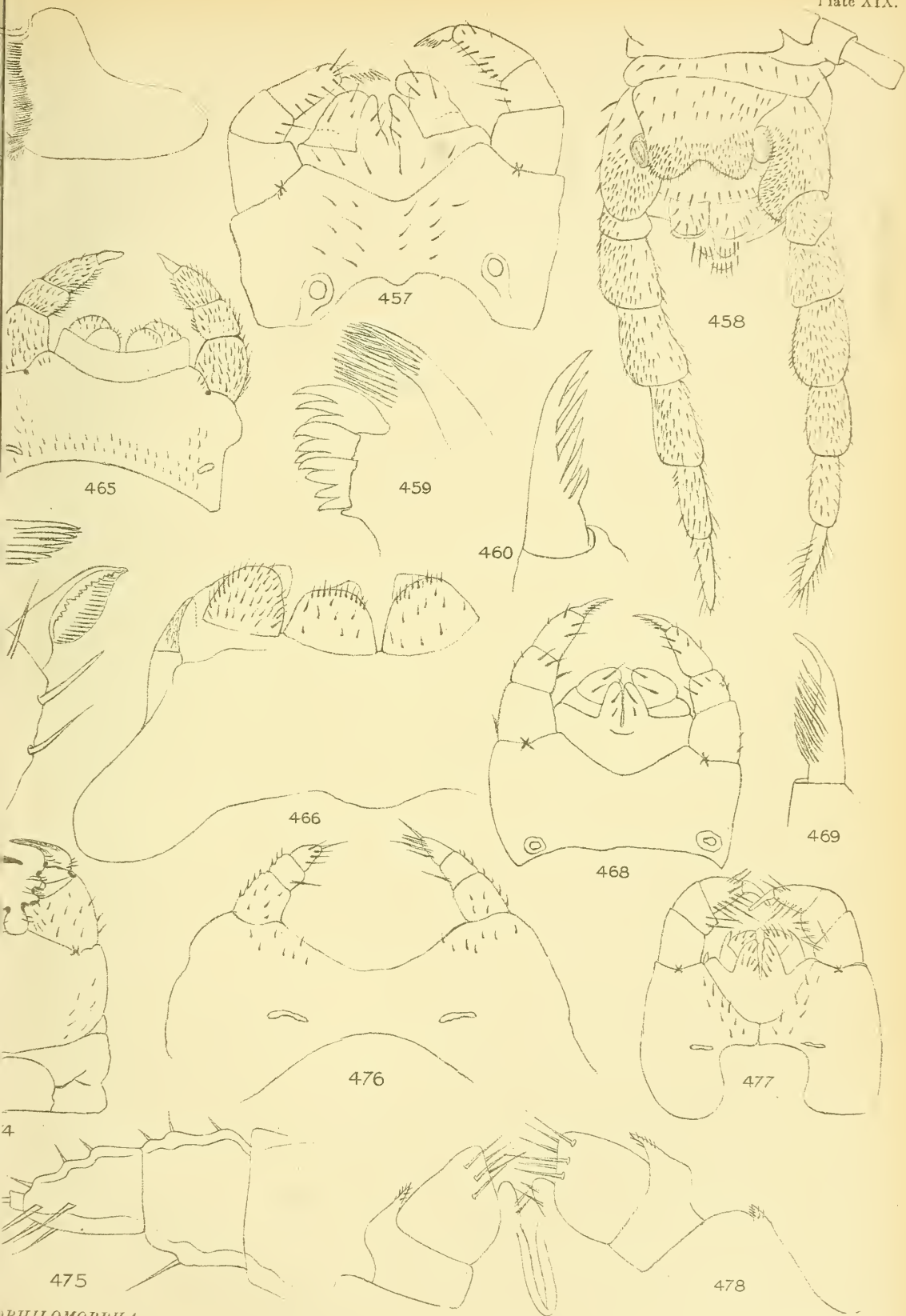


PLATE XX.

Polygonarea oligopus Att.

481. Posterior end, ventral view, ♂.

Achilophilus monoporus Att.

482. Posterior end, ventral view.

Purcellinus robustus Att

483. First maxillae.
484. Head, ventral view.
485. Head, dorsal view.
486. Posterior end of ♂, ventral view.

Eurytion trichopus Att.

487. Posterior end of ♂.
488. Antennae, terminal joint.

Pachymerium tristanicum Att.

489. First maxillae.
490. Lateral lobes of the first maxillae.

Eurytion dolichocephalus Att.

491. Maxillae, ♂.

Polygonarea monospathis Att.

492. Second maxillae.
493. First maxillae.
494. Maxillipedes.

Julomorpha (Hypochlorella) pallida Att

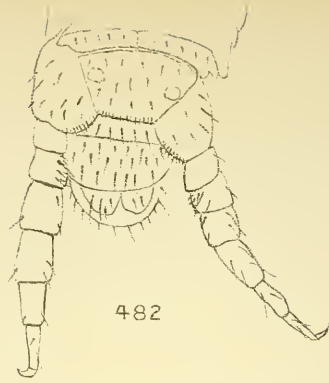
495. Anterior gonopod.
496. The same, view of inner side, more highly magnified
497. Posterior gonopods.

Spinotarsus lineatus Att.

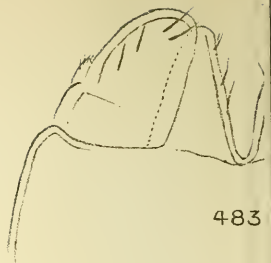
- 498, 499. Anterior gonopod.
500. Posterior gonopod.



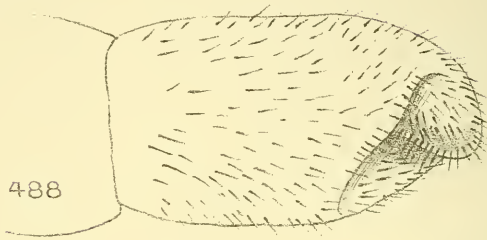
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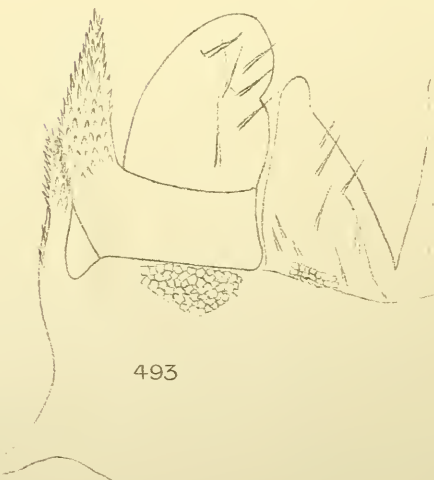
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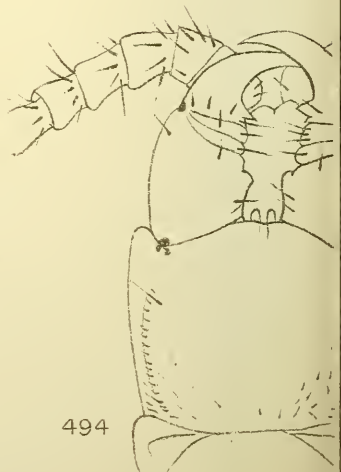
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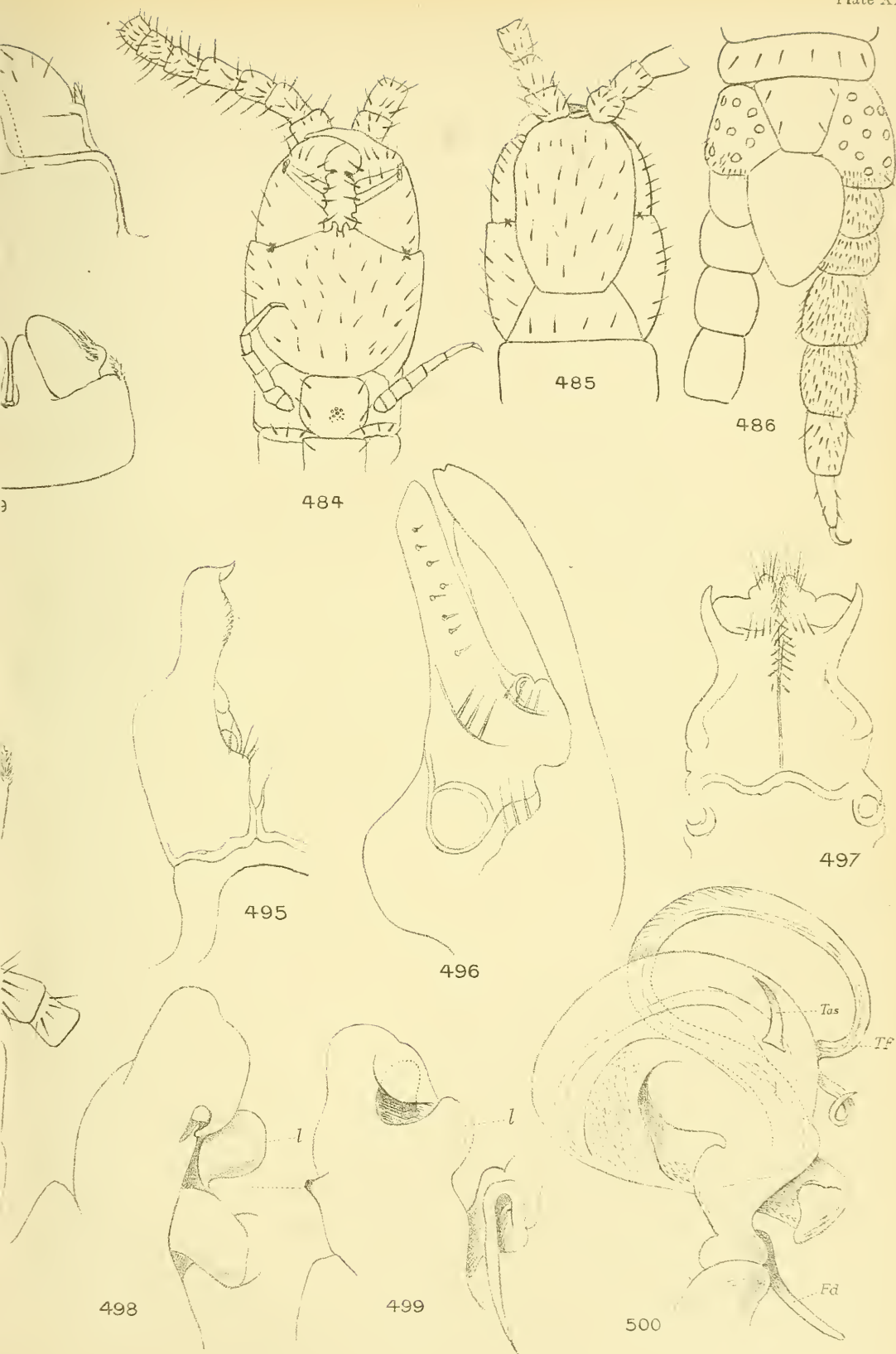


PLATE XXI.

Gnomeskelus spinifer n. sp.

- 501. Tenth segment, ♂.
- 502. Sixth segment, the right half from above, ♂.

Phaeodesmus niger n. sp.

- 503. Eleventh segment, ♂.
- 504. Gonopod.
- 505. Fifth segment, ventral side, ♂.
- 506. Seventh segment, ventral side, ♂.

Harpethrix plana n. sp.

- 507. Gonopods, from the front.
- 508. Coxae of the gonopods, from behind.
- 509. Seventh leg, ♂.
- 510. Anterior segments, ♂.
- 511. Fringes of the seventh segment, ♂.
- 512. Seventh segment, ♂.

Podochresimus alatus n. sp.

- 513. Gonopods.
- 514. Third leg, ♂.

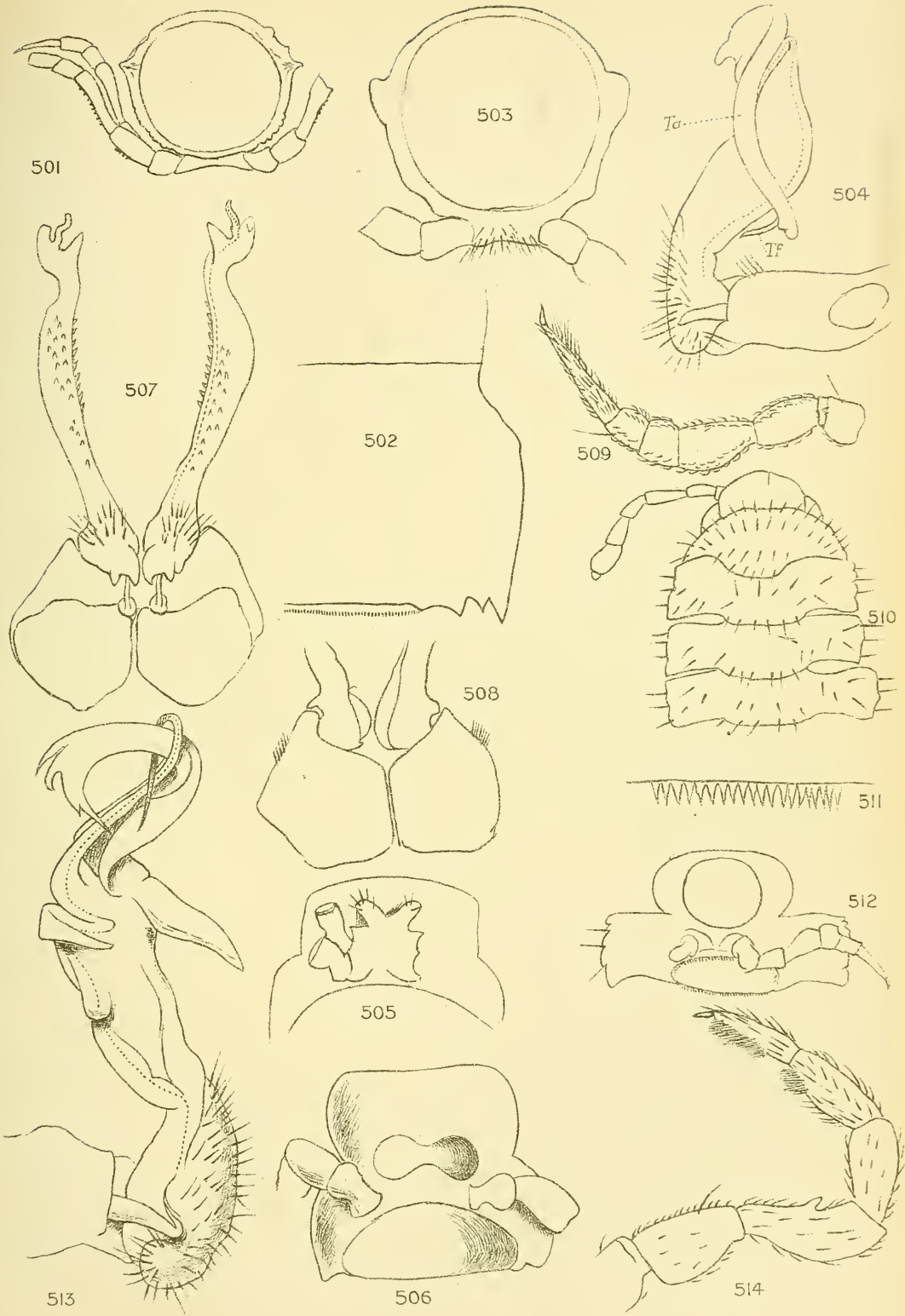


PLATE XXII.

Podochresimus alatus n. sp.

515. Fifth segment, ♂.

Chersastus splendidus n. sp.

516. Anterior gonopod, from behind.

517. Anterior gonopod, from the front.

518. Posterior gonopod, the tip more magnified.

519. Posterior gonopod.

Chersastus vulpinus n. sp.

520. Posterior gonopod.

521. Anterior gonopod, from behind.

522. Anterior gonopod, from the front.

523. Posterior gonopod.

524. Sterno-coxites of the first pair of legs, ♂.

525. The bases of the second pair of legs, ♂.

526. Third tergite and base of the third pair of legs, ♂.

Chaleponcus niger Att.

527. Telopodite of the gonopod.

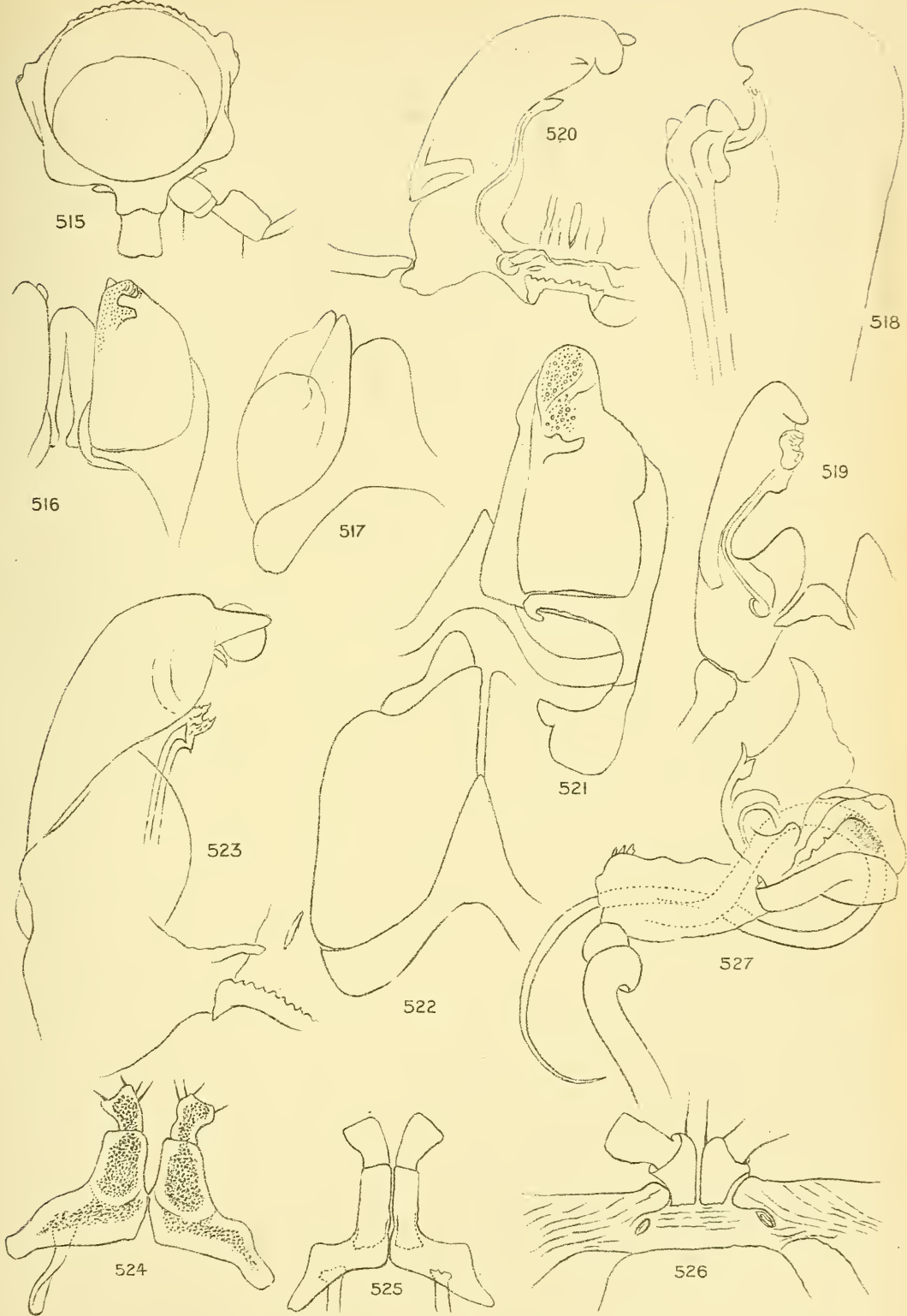


PLATE XXIII.

Gymnostreptus pontifex n. sp.

528. Gonopods.

Lophostreptus carli n. sp.

529. Gonopods.

530. Tip of the gonopod, more magnified.

Triaenostreptus conatus n. sp.

531. Gonopods, from the front.

532. Telopodite of the gonopod.

533. Tip of the gonopod, more magnified.

Odontopyge bullata n. sp.

534. Fringes of the metasomite.

535. Gonopods, from behind.

536. Telopodite of the gonopods.

537. Coxite of the gonopod, from the front.

Odontopyge dolabrata n. sp.

538. Telopodite of the gonopod.

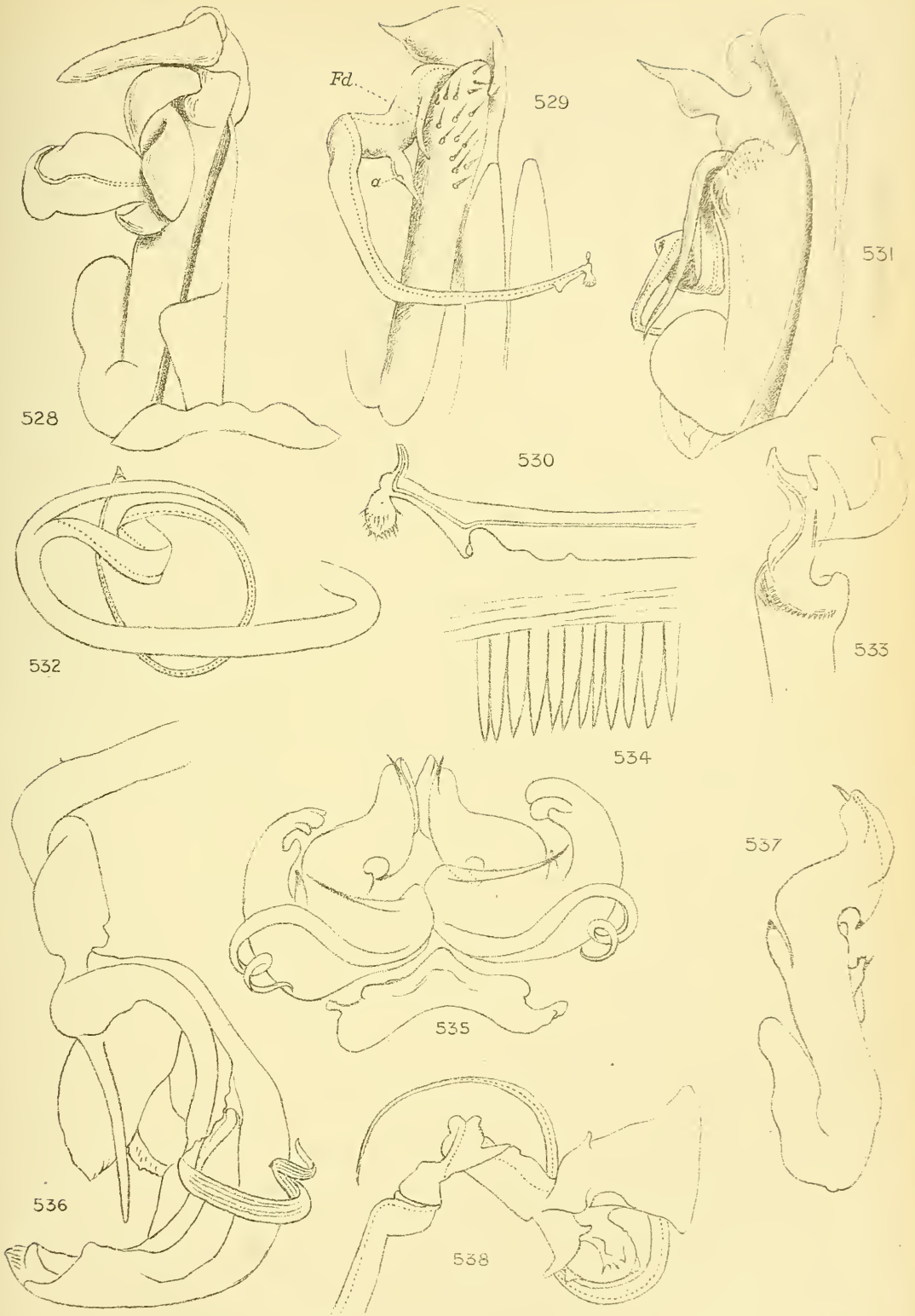


PLATE XXIV.

Odontopyge dolabrata n. sp.

- 539. Telopodite of the gonopod, the other side.
- 540. Coxites of the gonopods, from the front.
- 541. Coxite of the gonopod, from behind.
- 542. Second sternite of the seventh segment of ♂.

Haplothysanus modestus n. sp.

- 543. Gonopods, from behind.
- 544. Coxite of the gonopod.
- 545. Telopodite of the gonopod.

Spinotarsus robustus n. sp.

- 546. Telopodite of the gonopod.
- 547. Coxite of the gonopod, from the front.

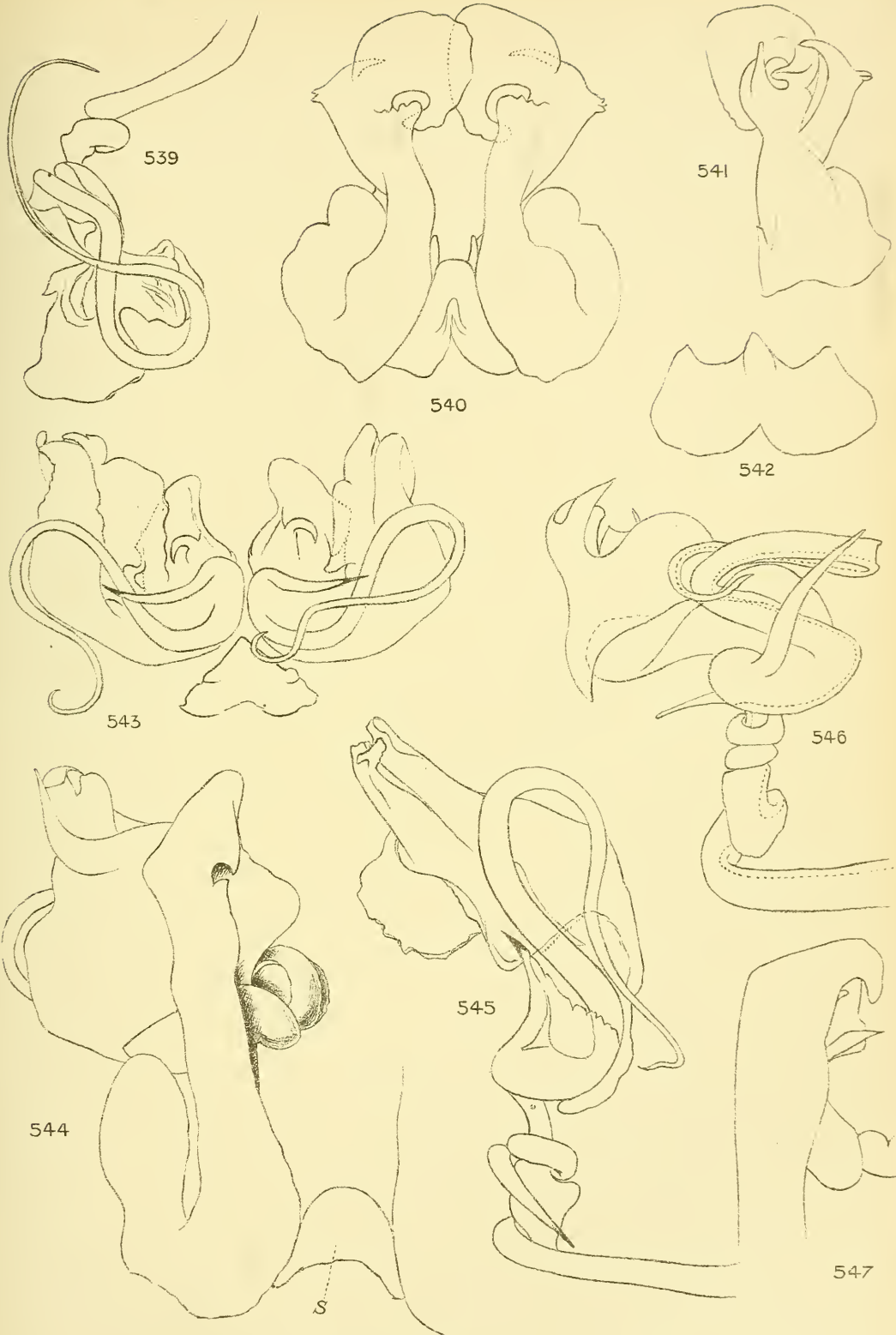


PLATE XXV.

Spinotarsus robustus n. sp.

548. Coxite of the gonopod, from within.

Chaleponcus masienensis n. sp.

549. Telopodite of the gonopod.

550. Gonopod, from the front.

Chaleponcus limbatus Att.

551, 552. Coxite of the gonopod.

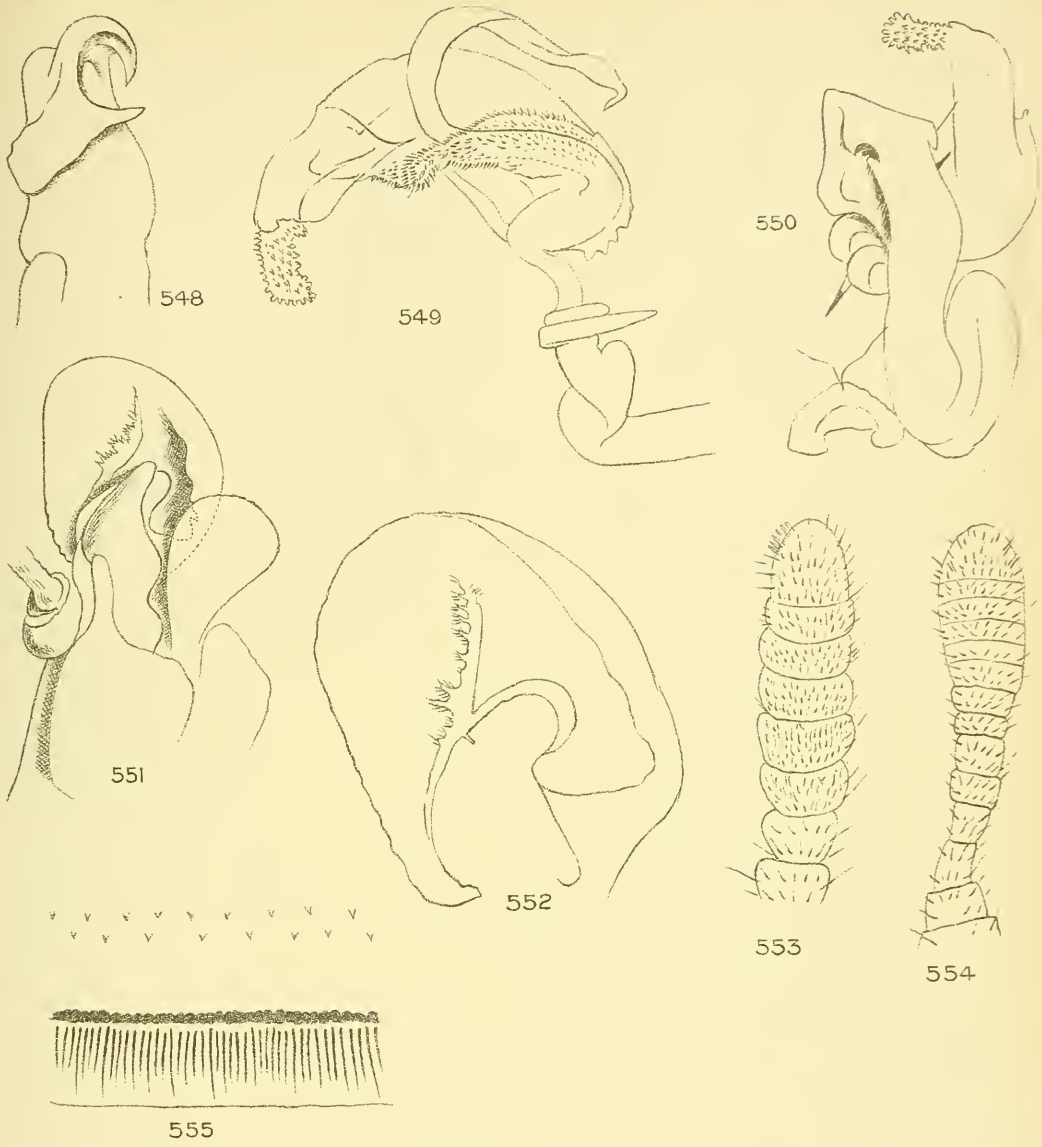
Ballophilus braunsi Silv.

553. Distal half of the antenna, ventral view.

554. Antenna, dorsal view.

Sphaerotherium millepunctatum Att.

555. Posterior margin of the metasomite.



CHALEPONCUS, BALLOPHILUS, Etc.

PLATE XXVI.

Sphaerotherium millepunctatum n. sp.

- 556. Posterior gonopod.
- 557. Anterior gonopod.
- 558. Twelfth leg, ♂.
- 559. Vulvae.

Kylindotherium leve n. p.

- 560. Anterior gonopod.
- 561. Posterior gonopod.
- 562. Vulvae.
- 563. Coxa of the twelfth leg, ♂.

Gnomeskelus dentipes n. sp.

- 564. Gonopod.
- 565. The tibio-tarsal part of the gonopod.
- 566. Fifteenth leg of the ♂.

Phacodesmus niger n. sp.

- 567. Fifth leg, ♂.

Gnomeskelus spinifer n. sp.

- 568. Left gonopod.

